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P R E F A C E.

IN the annual prefatory contribution to ‘THE ZOOLOGIST,’ we are apt to notice any new feature in the volume. On this occasion attention is attracted by the number of communications received from the more remote parts of the British dominions. Canada, West, Central, and South Africa, India, Ceylon, Burma, Australia, and Tasmania have alike furnished zoological records. We hope that our pages may be still more informative of the great fauna to be found by colonists and travellers in a region over which the sun never sets, that exhibits the extremes of temperature, and comprises great districts still awaiting the visit of a naturalist.

Our contributors have ably maintained the position of ‘THE ZOOLOGIST’ as the journal for animal bionomics, and in this work the ornithologists are again far in front. Ornithology and entomology are the studies which now impel most field-work, and for actual observations the followers of the first science appear to almost excel those of the second, a conclusion hitherto scarcely suspected—at least by the writer.

There are many invertebrates which are practically ignored in our pages. Our “Notes and Queries” afford a good index to the animals which are most observed by our readers and contributors; but we still hope, as is our annual custom, that these neglected orders may receive more attention. We do not ask contributors to neglect or go beyond their own subject, but they would confer a service to zoology by enlisting any students and observers of invertebrates—especially marine—with whom they

might come in contact as correspondents to 'THE ZOOLOGIST,' and thus make the Journal still more recognized as the record for zoological observations.

If last year was "an *Okapia* year," the principal zoological revelation of 1902 has also appertained to the Mammalia. We refer to the palæontological discoveries made by Dr. C. W. Andrews in a Pliocene deposit on the Wadi-Natrun, Egypt. The specimens found are the first evidence of the actual inhabitants of an early tertiary Ethiopian continent, the existence of which, though suspected on various grounds, had never been proved. Already this discovery has cleared up several important questions of geographical distribution, and has also shown definitely the point of origin of the Proboscidea and some other groups. Palæontology is not solely a section of Geology, as is too frequently held ; it cannot be divorced from Zoology. Palæontology *is* Zoology studied by the light of Geology, and thus comes within the scope and purpose of this Journal.

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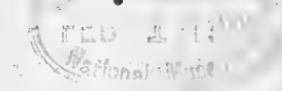
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ORNITHOLOGICAL NOTES FROM MID-WALES.

BY PROF. J. H. SALTER, University College, Aberystwyth.

THE following notes, referring to the past two years, are in continuation of similar ones relating to this neighbourhood which have appeared in 'The Zoologist' from time to time (Zool. 1900, pp. 76-79).

On January 10th, 1900, Mr. F. T. Feilden, of Borth, described to me a specimen of the "hairy" variety of the Waterhen which he had obtained some time previously. He reported a pair of Red-necked Grebes upon the Dovey during the previous October. One of them was shot, but not retrieved. On November 9th the survivor was seen in company with Dab-chicks and a Merganser. Further up the Bay, off the Merionethshire coast, Mr. G. H. Caton-Haigh finds the Eared Grebe by no means uncommon when on the spring passage, but he has never met with the Red-necked Grebe. Col. Feilden obtained a Bittern, an old male bird, upon January 8th. In February "a large brown Harrier," either a Marsh-Harrier or Ring-tail, was seen quartering over the Bog upon several occasions.

On March 3rd Oystercatchers and Curlew were extremely noisy after dark.

Capt. Cossens, of Llanbadarn, obligingly informed me of a specimen of the Norfolk Plover, which he remembered to have seen about 1882-83 when in the hands of Mr. Hutchings for preservation. It was obtained in the neighbourhood of Aber-aeron, and makes an addition to the list of Cardiganshire birds, of which I have previously recorded 212 species. Mr. E. E. M. Edwards obligingly informed me of an instance of the Woodcock breeding in the neighbourhood of Dolgelly, viz., in Dolg-y-Feiliau Wood, near Tyn-y-Groes. For some unknown reason, the nesting of the Woodcock in this part of the country is an event of extremely rare occurrence. Mr. Arthur Parry wrote me that a pair of Buzzards breed annually on Trychrug, near Cilcennin, in this county. On March 18th, in frost and snow, Mr. D. B. Grubb visited a Ravens' nest, which contained three eggs, in the wild hill-district of Cardiganshire. The cock Raven tilted at a Peregrine Falcon which came up the valley until both were lost to sight in the snow. Mr. Grubb had an excellent view of a Kite, and saw six Buzzards upon the wing at once. One of them was carrying a large stick to its unfinished nest.

On April 5th I visited a nesting locality of the Raven in the Nant Berwyn, near Tregaron. The cock Raven appeared upon the wing, barked a little, and seemed unwilling to leave the vicinity, but I could see nothing of the hen bird, and last year's nest had not been repaired. A young Mistle-Thrush of an early brood had already flown from the nest by April 10th. I saw two or three Choughs in the neighbourhood of the Monk's Cave, and was pleased to hear from Mr. Feilden that he has met with these birds more frequently of late. The same observer reported five Gannets off Borth. The rippling note of the Whimbrel announced its arrival upon April 23rd.

On May 9th I saw a Ray's Wagtail in fine plumage by the Rheidol. This species is very local with us, and does not breed within six or eight miles of Aberystwyth. On May 11th a pair of Ravens passed over my house, shortly followed by a third, the latter annoyed by Jackdaws. Ring Plover and Oyster-catchers were breeding as usual upon the shingle beaches at the mouth of the Dovey. Mr. D. B. Grubb kindly gave me an account of the birds seen by him while trout-fishing for three

weeks from May 19th in a remote part of the county. Only one Kite was observed, and the immemorial breeding haunt at Ystrad Ffin appeared to be deserted. At least eleven pairs of Buzzards were found to be nesting within a radius of some six miles from his headquarters, and instances in which the first-hatched and strongest nestling bullied the younger ones to death were again noted. In fact, this may be said to be a usual habit of Welsh Buzzards. Kestrels were tenanting a nest from which young Ravens had flown. Another Kestrel, having taken possession of a deserted Buzzard's nest, was sitting upon two Buzzard's eggs in addition to her own. A pair of Ravens in the Yrfon Valley had two young upon the wing. Pied Flycatchers were breeding freely, often in disused holes of the Green or Greater Spotted Woodpecker.

On August 30th, when ascending Cader Idris, I heard a Raven above Llyn-y-Cau. The Chiffchaff sang upon Sept. 16th and again upon Oct. 2nd, rather a late date. Redwings put in an appearance on Oct. 20th, and four days later a Thrush was coming into song again. An unusually large party of Long-tailed Tits numbered twenty-five. On Nov. 22nd a Chough passed over my house at a good height. A Mistle-Thrush was singing at the close of the year.

The year 1901 opened with mild, bright weather. On Jan. 1st Wood-Pigeons were cooing. On the 3rd a Raven passed high overhead croaking angrily. A month later, snow inland brought a few Golden Plover to the neighbourhood of the coast. On March 9th I watched numerous Curlew, a party of thirty Shieldrakes, and three Wigeon upon the sand-banks of the Dovey. Visiting the Bird Rock near Towyn upon Easter Monday, I found that as yet only half-a-dozen Cormorants were to be seen upon the breeding ledges. Five or six pairs of Herons were nesting in tall larches at Peniarth, further down the valley. A Wood-Lark was singing in the Nant Berwyn on April 17th. On the 26th I heard the note of the Turtle-Dove at Wallog, a decidedly early date for the arrival of this migrant, which is a scarce and local visitant to Western Wales. A Tree-Creeper nested for the fourth year in succession in precisely the same spot, between an ivy-stem and the tree-trunk.

Visiting the Teifi Bog, near Tregaron, on May 25th, I found

the Lesser Black-backed Gulls breeding in about their usual numbers at this inland haunt, twelve miles from the sea. Dunlin were also nesting upon the bog, and a pair of Redshanks passed overhead. On Whit Monday I visited a Buzzard's nest in the neighbourhood of Strata Florida. It was situated in a thin Scotch fir at a height of about thirty feet from the ground, and contained two young birds, differing in age, and an unhatched egg, together with a mole brought by the old birds as provision for the former. On June 15th I found a small colony of Lesser Terns breeding at the mouth of the Dovey, where, as Mr. Feilden informs me, they established themselves in 1896 or 1897.

The Redbreast began to sing again on July 27th. On Aug. 1st Chaffinches were singing their broken summer song, and two days later a Willow-Wren was warbling softly to itself. A late Yellowhammer's nest contained young nearly fledged upon Aug. 16th. On the 17th a Swift went to its nest-hole under the eaves for the last time.

A large number of Ray's Wagtails in fields beside the Rheidol on Aug. 20th were evidently on migration. A Chiffchaff was singing quietly its late summer song, which I heard again on Sept. 3rd. The Spotted Flycatcher was last noted on the 14th. On Sept. 15th a Stonechat "chacked" and sang a strain or two. At the end of the month the Whimbrel's note announced its presence upon the return migration.

A Thrush was coming into song again on October 23rd. The last member of a late brood of young Swallows lingered till Nov. 1st. On Nov. 2nd the Cirl Bunting sang; here the most constant of songsters, its monotonous trill is heard throughout the year.

Mr. D. B. Grubb, who again visited the district referred to above, informed me that eggs had been taken from two Kites' nests, those of the only two pairs which continue to frequent that neighbourhood. An unsuccessful attempt was made to protect one nest by coiling barbed wire round the trunk of the tree. This fine species is nearing extinction in Wales, its nests being ruthlessly harried by egg-dealers whose names are perfectly well known. There is no possibility of these Kites breeding successfully except under such protection as would be afforded

by a resolute and reliable watcher, never out of sight of the nest night or day. A clean sweep had also been made of the Buzzards' eggs, and it is probable that a dozen pairs did not succeed collectively in bringing off more than three or four young.

Egg-collecting, and not the persecution of the gamekeeper, will be eventually responsible for the extinction of both the Kite and Buzzard in Central Wales.

Mr. Grubb tells me that he found the Pied Flycatcher extremely scarce, in marked contrast to its abundance the previous year.

The following notes contain a summary of the information obtained in response to a printed circular asking for details as to the occurrence or otherwise of certain species whose distribution in Wales appears to be imperfectly known.

With regard to the Lesser Whitethroat, Capt. Swainson amplifies the account which he has given of this species in Breconshire in 'The Zoologist' for 1891, p. 356. He writes of it as being not uncommon at Brecon, and sparingly distributed over all the lowlands of the county. It occurs westward up to the point where the Mynydd Epynt hills begin to rise. "The most westerly point at which I have ever heard it is Llanwrtyd." As far as my own experience goes, the Lesser Whitethroat is entirely wanting in Cardiganshire. In Montgomeryshire I heard it at Welshpool on May 26th, 1900. Mr. G. H. Caton-Haigh has only one doubtful record of it in Merionethshire. Mr. O. V. Aplin failed to identify it in the Lleyn peninsula of Carnarvonshire, but states that Mr. Coward observed a pair breeding at Abersoch in May, 1893 (Zool. Nov. 1900, p. 492).

It may be said then that the Lesser Whitethroat ranges, upon the eastern side, up to the foot of the chain of elevated moors and sheep-walks which forms the backbone of the Principality, but seldom or never crosses these treeless uplands, and is consequently absent from Western Wales. To this statement Mr. Coward's observation appears to furnish the sole exception.

None of my correspondents have any knowledge of the Tree Sparrow in Wales. Capt. Swainson says, "I have never been able to find it, although I have always been on the look-out."

Another species to whose distribution a special interest attaches is the Twite. As regards Breconshire, Capt. Swainson

writes: "I have been a great deal on the hills at all seasons without seeing or hearing the Twite. Moreover, I have often looked for it upon the mountains of North Wales, but without success." Personally I have failed to meet with the Twite in Cardiganshire, even in localities which appeared extremely well suited to it. Mr. G. H. Caton-Haigh has not come across it in Merionethshire. As regards Carnarvonshire, Mr. O. V. Aplin, when on the mountain called Yr Eifi, or The Rivals, north of Pwllheli, noticed one or two birds which he judged to be Twites from their note. He states that Mr. Coward saw flocks on The Rivals and Carn Madryn (Zool. 1900, p. 493). I have no information from the Berwyn mountains, where the heather-grown grouse-moors furnish much likely ground. The evidence thus favours the view that the Twite ranges into North Wales, but does not reach the central or southern hill-districts of the Principality.

The Hawfinch Capt. Swainson characterizes as a rare resident in Breconshire. He writes: "I know of two instances of its nesting here (at Brecon). About three years ago small flocks attacked the peas in July, and on two occasions several were shot."

The Wryneck is described as "very rare" in Breconshire. Capt. Swainson says, "I am acquainted with its cry, which I have heard here only once, eleven years ago." Mr. F. T. Feilden has heard the note of the Wryneck at Three Cocks Junction.

With reference to the Kite in Breconshire, Capt. Swainson writes as follows:—

"Still a resident, but very rare. It is difficult to estimate the number of pairs, as they change their nesting places from year to year, but I should be inclined to think that there are about two pairs left. I myself have not seen bird or nest for seven years. Formerly the Kite used to breed yearly near Aberbran, about five miles west from Brecon (Zool. 1889, p. 226). In 1894 a pair of Buzzards took possession of the wood and nested, and the Kites were not to be found, but in 1895 they returned. There is in a Brecon collection a clutch of three eggs taken from this wood. There are five or six places in the county where the Kite occasionally nests or tries to. I have heard on pretty good authority that a pair brought off a brood

safely in 1899 at Upper Chapel (the place alluded to in Mr. Phillips's List of the Birds of Breconshire, Zool. 1882). I have been unable to get any information for the present year (1900).

"I am afraid that, like yourself, I must come to the conclusion that the species is doomed. What is the use of a fine of £1 when the eggs and bird are worth two or three times as much? A gamekeeper once said to me, 'A dead Kite is worth £2 or £3: how can you expect a poor man to spare one?'"

THE BIRDS OF BARDSEY ISLAND, WITH ADDITIONAL NOTES ON THE BIRDS OF LLEYN.

By O. V. APLIN, F.L.S.

THERE are few inhabited places in Southern Britain more inaccessible than Bardsey. This arises rather from the difficulties which frequently attend the passage to or from the island than from its remoteness. For its northern extremity is less than two miles from Trwyn-y-Gwyddel, the nearest point of the mainland of Lleyn, while the passage from Aberdaron, where you take boat, to the landing-place, Cefn Enlli, extends over only about five miles. But Bardsey derives its ancient Welsh name, Enlli, from the fierce current which rages between it and the mainland, and it is only at certain states of the tide that a crossing can be made. Moreover, if it blows hard, as it so often does on this windy coast, winter and summer, it is altogether impossible to cross the sound in an open boat, in one direction or the other, and most likely in both; so that it is commonly said that no one should go to Bardsey who is not prepared to stay a week. I started about noon on the 23rd May, 1901, to cross to the island, in calm weather. But as in my hurry to set foot on the famous isle (having been baulked of my desire the year before) I had persuaded the boatmen to start too early, we were caught under Bardsey cliffs by the last of the tide, and our boat was tossed about somewhat like a cork in a pot of boiling water—and this in a dead and stifling calm. I intended to get away again on the morning tide the following day. But at night it came on to blow; at daybreak, I was told, no boat could cross, and, true to its character, Bardsey kept me a prisoner until the next tide. This did not matter, and I had so much more time with the birds. We got off finally about half-past one, with the wind nearly ahead, light to moderate, and coming rather squarely off the land. We had borrowed an extra sail and taken in a small cartload of big stones for additional ballast. We rowed

under the cliffs to the north end of the island, then sailed rapidly across the sound and in under the cliffs of Pen-y-Cil, whence we slowly made our way along under the land to Aberdaron. The passage took two hours, a fact worth the attention of anyone visiting Bardsey and hoping to catch the daily mail-cart which connects Aberdaron with the outer world.

Bardsey is naturally divided into two parts. Nearly two-thirds of the larger, northern portion—over a mile long and nearly three-quarters of a mile wide—consists of cultivated ground and poor pasture land; and the other third or more is occupied by the mountain (548 feet). The steep, grassy slopes of this (then very slippery from the long-continued dry weather, and a little dangerous on the seaward side) are dotted on the west side with hard clumps of sheep-bitten gorse, and varied by stretches of fern towards the sea. Rocks and crags rise out of the turf at the top and on the north and east sides especially, and sometimes form small cliffs. To lose one's footing on the seaward side would in many places mean falling on to the rocks below or going over the cliffs into the sea. The southern portion of the island, where the lighthouse stands, does not rise more than about fifty feet above the sea. It is connected with the other part by a very narrow neck, and although three-quarters of a mile long is only about a quarter of a mile wide anywhere. It affords only some pasture, poor everywhere, and consisting in places of little more than heather, an inch high, scilla, armeria, and lotus. The only trees on Bardsey are two or three sycamores and a few ashes (really not worth calling trees) which grow at the foot of the mountain, just where the farms lie and shelter them a little with their buildings. Here, too, are some wind-seared elder-bushes. In the little gardens gooseberries and currants grow well to the height of the wall, and there are a few "tea-shrubs," fuchsias, and tamarisks, etc. The banks of earth and stone which form the fences on the low ground are capped with bramble, gorse, fern, and occasionally with a foot of scrubby hawthorn, and one or two larger bushes of the latter may be seen. In one sheltered part of the mountain, at Pen Cristin, there is some taller gorse, not bitten down by sheep into a hard cushion. Two wettish places, fenced in, about ten yards square, where the waste of springs has been utilized to

grow a kind of willow for bands, present a greater growth of elder, bramble, and tall weeds. And there, and along a bank near one of them, I found many of the small birds I noticed. The banks are gay with thrift, vernal squill, the sweetly-scented burnet-rose, gorse, sea-campion, and a few foxgloves; and I saw some dwarf bluebells and the lady's-fingers (*Anthyllis*). Excellent samphire (*Crithmum maritimum*) grows in abundance on the low rocks, and has been gathered for a hundred years at least.

On the east side the coast of Bardsey presents a front of dark coloured rock to the restless sea. Here on the sloping rock-faces, and the ledges, the Herring-Gulls, which breed there in considerable numbers, are conspicuous. The steep shelving rocks are varied with more precipitous faces, overhung ledges, hollows, and chasms. Along the coast of the lower lying parts of the island there is a broad breastwork of broken jagged rock, high enough sometimes to form low cliffs, and indented with yawning chasms, whose sides are high and steep enough in some cases to accommodate the Chough. Where these rocks merge into the short weedy turf the Oystercatchers breed, the pairs flying on to the outer rocks as one approaches, where they sit and cry "feet," or "fic" or "pic," an unlimited number of times, and sometimes "my feet." Rock-Pipits flit about too; I hesitate to say breed, for I think of the hours I have spent in an always unsuccessful search for this bird's nest. Where the one little inlet affords a harbour and safe lying for the boats, a stretch of sand and seaweedy rocks is uncovered at low tide. Bardsey is included in Willughby's 'Ornithology' (1678), among the list "Of some remarkable Isles, Cliffs, and Rocks about England, where Sea-fowl do yearly build and breed in great numbers," but no particulars relating to it are given. I do not, however, think that Bardsey could have been a great sea-fowl station within the period of modern history. The then Vicar of Aberdaron (in whose parish Bardsey lies), in the account of the island with which he furnished Bingley in 1798, asserts, it is true, that "among these precipices the intrepid inhabitants, in the spring of the year, employ themselves in collecting the eggs of the various species of sea-fowl that frequent them"; and he describes the manner of climbing pursued in collecting the eggs and the samphire. The Bardsey men gather eggs now, but these are all,

or nearly all, Herring-Gulls' eggs. Pennant, who visited the island on one of his Tours (about the year 1774-75), said it was "well cultivated and productive of everything which the mainland affords"; but he does not mention the birds at all, though his visit was evidently made in the summer; and he would surely have done so had there been any remarkable gathering of them. He mentions the Puffins at St. Tudwal's. There are no Puffins on Bardsey now, and, although it is distinctly stated in Book III. of the 'Ornithology' that the Puffins bred yearly in Bardsey in great numbers, I think this is a little doubtful. The author, or his editor, may have seen the Puffins belonging to Ynys Gwylan, which are scattered over the sea near Bardsey in the summer, and concluded that they bred on the latter island. The low part of the island is, indeed, suitable for Puffins, but the greater part of it has long been under cultivation. In 1798 Bardsey had seventy inhabitants, engaged in fishing and agriculture. In more remote days it was apparently even more thickly populated, and it was visited by a great many pilgrims. It was called by the Welsh poets the Sanctuary of Saints, and the Isle of Refuge. The reputed sanctity of the island induced the religious to resort to it from many very distant parts of the kingdom. The monastery (of which the ruins remain) is said to have been founded in the eighth century, but there is evidence that there was a religious house in the island at a much more early date. The odour of sanctity clung to the place down to Pennant's time. When the foundations of one of the new farms was laid, old gold coins, "each worth two guineas," were found; and it is said that one could not dig deeply in one part without finding them. This means pilgrims, and a well-found monastery; for, though many would come empty, the full paid for all. The coming and going of so many people must have made Bardsey anything but a "lonely resort of sea-fowl," and the demands upon the eggs of those that bred there must have been large. This state of things can hardly have co-existed with a large Puffin-warren on the lower part of Bardsey, where the farms lie. The mountain could never have accommodated them, I should think. The soil is shallow, and there are not sufficient holes and crevices under and in the rocks to house a large Puffin population. Willughby, and his editor Ray, gathered a good deal from hearsay. They relate that

"a certain Fisherman told us, that in the middle of Winter he once found a *Puffin* under water, torpid, among the Rocks not far from Bardsey Island, which being again cast into the Sea straightway sank to the bottom. Believe it that will." But Bardsey has always been a strange place, and is so still, as will presently appear from what a man told me about the Frogs. Twenty thousand saints, too, are buried here, albeit one writer sagely remarks : "It would be much more facile to find graves in Bardsey for so many saints, than saints for so many graves." There are no Kittiwakes on Bardsey, and only a few Guillemots and Razorbills.

A head-wind on our return journey necessitated our hugging the cliffs from Pen Cristin nearly to the northern extremity of the island, and I could see no high cliff sheer from the sea with ledges extensive enough to form a breeding station of the *Alcidæ* of any importance. There are ledges which would do for Cormorants, and hollows for Shags, but I saw no large cave. Starlings, too, breed in the rocks, and, higher up, Jackdaws and a pair of Peregrine Falcons. A large number of Herring-Gulls inhabit the shelving—and, to some extent, sloping—cliffs immediately above the sea; but, with the exception of the Shearwaters and a few other species, these are the only sea-fowl for which Bardsey is now remarkable.

There are, I was told, no "great snakes" on Bardsey; only "little small ones" (? Blindworms). The Vicar of Aberdaron, in 1798, stated that "none of the inhabitants ever saw in it Frog, Toad or snake of any kind." I inquired if there were any Frogs now. "No," said my informant; "and if any Frogs are brought to the island they die—ay, and if you take of the earth of Bardsey, and put it into where there are Frogs on the mainland, the Frogs all die." "That," said I, "is what you have been told." "That is what I have seen," he replied. "You have tried it yourself?" I asked. "Yes, I have done it myself," said he. "And the Frogs died?" "Die they did," said he.* After that I said no more; and I merely add now, with the author of the 'Ornithology,' "believe it that will." There are Rabbits about the low grounds, and some on the mountain, the latter having their habitations chiefly among the stony rocks. Those that I saw

* Cf. Giraldus, of the Irish soil.

appeared to be rather warmly coloured, but this may have been caused by the contrast with the sad colour of their surroundings, caused by the severe drought then prevailing, which told terribly on the shallow soil of this outlying spot.

The most noticeable land-birds were the Corn-Bunting, Blackbird, Starling, Corn-Crake, and Jackdaw. There are some common birds found in Lleyn which I could not find on Bardsey ; and, as the birds there are rather tame and conspicuous, it is not likely that I should overlook them if they were to be found on the island at all commonly. The Robin and Stonechat, both common on the adjoining part of the mainland, are among them. Both may have been temporarily exterminated by the long continuance of heavy storms from the sea which battered Lleyn in the previous winter. I think if there had been any Sky-Larks on the island they would surely have been singing over the fields at five o'clock on a fine May morning. I saw no Swifts or Yellow Buntings ; I may have overlooked the Wren. I saw thirty-nine (or forty) species of birds in all, and the list, although doubtless incomplete, may be worth printing, as it gives, at all events, a fair idea of the bird-life of this outlying bit of North Wales.

1. BLACKBIRD (*Turdus merula*).—Very common, conspicuous, and tame. For want of a better place, the males sang from the top of the stone gate-posts, and from big stones.

2. WHEATEAR (*Saxicola œnanthe*).—Fairly common.

3. WHITETHROAT (*Sylvia cinerea*).—Fairly numerous about the taller gorse.

4. WILLOW-WREN (*Phylloscopus trochilus*).—A few about the low-lying parts.

5. SEDGE-WARBLER (*Acrocephalus phragmitis*).—One or two about the willow-beds.

6. HEDGE-SPARROW (*Accentor modularis*).—Pretty common in the lower parts ; carrying food.

7. MEADOW-PIPET (*Anthus pratensis*).—Some about the mountain and lower pastures.

8. ROCK-PIPET (*A. obscurus*).—Fairly common.

9. SPOTTED FLYCATCHER (*Muscicapa grisola*).—Several about the farm-gardens.

10. SWALLOW (*Hirundo rustica*).—A good many.

11. HOUSE-MARTIN (*Chelidon urbica*).—Several seen; one flying about the top of the mountain.

12. SAND-MARTIN (*Cotile riparia*).—A few seen.

[PIED WAGTAIL.—I believe I remember seeing one about one of the farms, but as it is not put down in the pocket-list I made up as I saw each species, I have not numbered it here.]

13. GOLDFINCH (*Carduelis elegans*).—At least one pair, and, I believe, more.

14. LINNET (*Linota cannabina*).—Several seen.

15. HOUSE-SPARROW (*Passer domesticus*).—A fair number about the farms. The males were very bright and clean-looking. In the account of Bardsey furnished to Bingley in 1789 by Mr. Jones, Vicar of Aberdaron, it is stated that, "till about four years ago, no sparrows had been known to breed here; three nests were, however, built during the same spring, and the produce have since completely colonized the place."

16. CHAFFINCH (*Fringilla cœlebs*).—Fairly common; in fine song.

17. CORN-BUNTING (*Emberiza miliaria*).—Common; its skirling, jingling song was to be heard all about the cultivated parts of the island.

18. STARLING (*Sturnus vulgaris*).—Abundant. Some breed about the cliffs, but many breed in shallow holes in the turf and stone banks which divide the fields. The holes are about two feet (and sometimes less) from the ground, and so shallow that the noisy gaping young were only two or three inches from the surface. Some of the banks were quite musical with the cries of the young birds. Some pairs were breeding in shallow hollows inside an old lime-kiln, and one brood of young could be seen by an observer standing at a distance of a yard or two from the hole.

19. COUGH (*Pyrrhocorax graculus*).—In the evening three birds looked very pretty soaring, and wheeling about in curves and circles over the hill-side, evidently at play. They were rather tame, and came so close that their red feet could be seen tucked closely up to their bodies. As they wheeled in the air they spread their tails occasionally. Later on I saw a rather noisy and angry pair at a spot where they were probably breeding. The local name is "Bran pig coch."

20. JACKDAW (*Corvus monedula*).—Common.

21. CARRION-CROW (*C. corone*).—One pair seen.

22. CUCKOO (*Cuculus canorus*).—Several; one beating about near the willows.

23. PEREGRINE FALCON (*Falco peregrinus*).—"Gwalch glas." There was evidently a pair breeding somewhere on the most cliff-like crag on

the mountain ; but we did not move the female, which must have been sitting on a late clutch of eggs. During the time we were in the vicinity of the crag, the male—a beautiful old blue bird—continued to circle round, occasionally coming overhead, and comparatively close to us. He cried incessantly his harsh grating “ quayk quayk quayk quayk.” The next morning, when I went up by myself, he behaved in the same way.

24. KESTREL (*F. tinnunculus*).—Only one seen.
25. CORMORANT (*Phalacrocorax carbo*).—Seen near Bardsey.
26. SHAG (*P. graculus*).—A few along the east side, where I think they breed.
27. STOCK-DOVE (*Columba oenas*).—One on the mountain side.
28. TURTLE-DOVE (*Turtur communis*).—To my great surprise, I saw one feeding in one of the little fields. I had never previously met with it in Lleyn, nor, indeed, in any part of the counties of Carnarvon and Merioneth. This individual was probably a wanderer ; and the species may be extending its range in North Wales. A friend of mine saw one this year near Dolgelly in May ; the only previous occurrence in that neighbourhood known to me was in a past September, when two were seen (and, I think, shot) close to Barmouth.
29. CORN-CRAKE (*Crex pratensis*).—Common. I could hear three calling at one time.
30. PEEWIT (*Vanellus vulgaris*).—A few ; chiefly about the light-house end.
31. OYSTERCATCHER (*Hæmatopus ostralegus*).—“ Saer ” = the artificer. Fairly common, especially round the rocks of the south point, and along the west side. I think they were breeding where the turf merged into the rocks. But I only looked for one nest ; this was among some jagged whitish rocks at the edge of the turf. It was lined with angular stones half an inch to an inch in length, and contained two eggs, the finest Oystercatcher’s eggs I ever saw. The one I took was partly incubated. It is a long, rather pointed egg, well marked with large dark markings chiefly round the big end, where the blotches and streaks form a broken zone. The birds mobbed me savagely, flying within ten yards or less of my head, with loud shrieks of “ pic.” When they settled at a little distance this cry was uttered so rapidly that it developed into a trill.
32. DUNLIN (*Tringa alpina*).—One or two immature birds about the landing-place.
33. COMMON SANDPIPER (*Totanus hypoleucus*). — One there. It is quite possible that this species may breed on the island.
34. CURLEW (*Numenius arquata*).—One or two seen.

35. HERRING-GULL (*Larus argentatus*).—Breeding in considerable numbers at the foot of the mountain, on the shelving rocks over the sea. I think a few pairs breed in the breastwork of rock about the south point and the south-west side.

36. GREAT BLACK-BACKED GULL (*L. marinus*).—One pair had a nest and three eggs near the Herring-Gulls.

37. RAZORBILL (*Alca torda*).—I only saw two or three at the foot of the cliffs. They are said to breed in one inaccessible spot.

38. GUILLEMOT (*Uria troile*).—About a score or more with the Razorbills. Probably the breeding-place is somewhere about the north-east corner. I do not think there can be many birds of either species there ; for, although Razorbills began laying in another breeding-place in Lleyn at this date, no Guillemot's egg was seen until a day or two later, although the birds were sitting about the ledges. The proportion of Bardsey birds presumably on the cliff, and not seen by me, to those on the water would probably not have been large.

39. MANX SHEARWATER (*Puffinus anglorum*).—There is a considerable colony at the north-east end of the island, on the side of the mountain. When I left the breeding-place, about 9.30 p.m., all was quiet ; but about midnight I could hear numbers crying incessantly "cock-cock-go-grow," or "cock-go-grow," over the fields in front of the house I was sleeping in. And one of my boatmen, who was coming along the road about that time, said that, although it was too dark to see them, they appeared to be flying about over the fields, low down. They breed chiefly on a steep grassy cliff varied by patches of fern, and large rocks which project from the turf. Some of the Shearwaters breed in holes under these rocks where they emerge from the turf; others in long clefts in, and winding passages among, the rocks. Most of the birds and eggs are quite inaccessible, but certain marks at the entrance denoted an occupied hole. Some of the birds were indignantly noisy when a stick was gently pushed into the easier holes. We extracted two birds and an egg from burrows. The birds are very savage, and bite everything within reach, and they inflict a painful bite. Another egg we could see in a cleft in the rocks, but could not reach. In one place there was a little cave under some rocks, and in it on the bare earth floor we could see an egg. The entrance of the cave was large enough, when a sod had been pulled away, for a young boatman to wriggle in on his stomach and fetch the egg ; inside the cave was large enough for him to turn in. The bird must have retired to some inner fastness. Both the other eggs lay on the bare soil. As far as I have seen the ground immediately in front of holes selected by Shearwaters to breed in always falls very sharply; indeed, in some

cases there is a nearly perpendicular rock face or turf slope; this enables the birds to get on the wing readily. I tried to find out if the Shearwater stands on its foot (toes and webs) alone, or on its foot and tarsus, but without coming to a perfectly satisfactory conclusion. But my impression is that when a Shearwater is standing still, on land, it rests on the foot and tarsus; but when it runs forward a few steps to get on the wing, it rises on to its feet. Birds which I held by the tips of the extended wings moved in this way, but declined to remain still. And two that were sent to me once in an open box (from which they could not rise) were always squatted down, until I liberated them.

The avifauna of Bardsey is not unlike that of Lambay Island, off the opposite coast of Ireland, but further north (*vide Zool. 1882, p. 155*). Of the forty-four species in Mr. Hart's list, I have seen twenty-seven in Bardsey, and all the others (except the Twite, Hooded Crow, Rock-Dove, Black Guillemot, and perhaps the Ring-Dove) very probably occur. In respect of the last named allowance must be made for the different character of the respective mainlands. The Carrion-Crow is naturally replaced on Lambay by the Hooded Crow, although the latter is stated to have been very rarely seen in that part of Ireland at that date. The Black Guillemot formerly bred on Lambay; indeed, a few pairs are said to breed still, as well as on Ireland's Eye, and perhaps at Howth and Wicklow Head, still nearer Bardsey ('Birds of Ireland'). Yet we have no record of it breeding on Bardsey, or in any part of Lleyn.

Of the forty species seen on Bardsey, twenty-seven occur in the Lambay list; and of the other thirteen, one (the Chough) formerly bred there, and the rest (save the Carrion-Crow, Turtle-Dove, and Stock-Dove) are all common Irish birds. The Turtle-Dove is as rare in Lleyn as in Ireland. Part of the (limited) breeding range of the Stock-Dove in Ireland (Wicklow) lies just opposite Bardsey.

(To be continued.)

OBITUARY.

HUGH ALEXANDER MACPHERSON, M.A.

RARELY, indeed, have the interests served by this Journal sustained a greater loss than in the premature removal from our midst of the Rev. Hugh Alexander Macpherson. A sudden attack of inflammation, resulting from exposure to inclement weather, on a constitution never quite robust, came on the 23rd, and on the 26th November a bright existence passed away.

A member of an ancient branch of the Clan, that has given many members to high public service, he first saw the light in Calcutta, forty-three years ago, the eldest son of Mr. William Macpherson, of Trinity College, Cambridge, editor of the 'Quarterly Review.' His grandfather was Dr. Macpherson, Professor of Greek in King's College, Aberdeen. Educated at Haileybury and Oriel College, Oxford, he received the degree of B.A. in 1881, and M.A. (with honours) in 1884. He was ordained to the ministry in 1882, and served as curate of St. James's, Carlisle, till 1885, when he went to London, and held curacies in Upper Holloway and Paddington. He came back to Carlisle three years later, and remained there in various ecclesiastical offices till 1897, when he accepted the incumbency of Allonby, close by the ever-troubled waters of the Solway Firth. About a couple of years ago he removed to another charge at Pitlochry, in the Central Highlands, where a busy life has closed all too soon. Although a Highlandman, his heart was where his life's work had been done, and by his own wishes his body was laid to rest in the cemetery of the old Border City he loved so well by a great company of mourners, and amidst numerous manifestations of public grief.

As a naturalist, Macpherson possessed a rare—almost a unique—combination of qualifications; he was equally eminent in both field and cabinet work, while as a scholar he wielded a pen of high literary excellence. Indefatigable in his outdoor

observations, one day he would be found wandering amidst the splendid scenery of Lakeland, interrogating the dalesmen on points in the history and traditions of the wild things around ; the next lying hidden along shore, glasses and book and pencil before him, watching and noting the actions of the waders and wildfowl as they were moved along the great sand-banks by the swift flowing tide of Solway ; or, maybe, on one of the native whammle boats going down the firth on the ebb, ever amassing the knowledge which, in many hundreds of articles and paragraphs, he contributed so profusely to these and other pages.

The same industry with which he carried on his general work characterized his correspondence. Letters of three or four sheets and post-cards followed each other in such rapid succession, that any conscientious correspondent not gifted with the like enthusiasm had difficulty in making due acknowledgment. Telegrams, too, came at times when anything he thought important cropped up. We remember with pleasure how, seated at breakfast one May morning in 1888, a "wire" was laid before us, which read as follows :—"Pallas's Sand Grouse have arrived in numbers. Look out for them. Tell everybody. Macpherson." The state of suppressed excitement under which our friend laboured in making such an announcement can well be imagined by those who knew him.

His keenness of disposition and Celtic fervour of temperament occasionally led him into impatience with fellow-workers, and it has to be said that, now and again, some little disagreements resulted where more phlegmatic individuals would never have noticed any incompatibility. But no permanent estrangements ever resulted. Macpherson was always first to heal any breaches thus made.

His first work of importance was the volume on the 'Birds of Cumberland' (1886), prepared in collaboration with Mr. Wm. Duckworth. Next followed the 'Visitation of Pallas's Sand Grouse to Scotland in 1888' (1889). Three volumes of the 'Young Collector Series'—"Fishes," "Mammals," and a "Hand-book of British Birds"—were undertaken and issued in 1891. The last named, although certainly of rather limited dimensions, is really a capital little manual, and ought to be more widely known than it is. In 1892 came his *magnum opus*, 'The Verte-

breat Fauna of Lakeland.' Suggested by, and following the main lines of, Harvie-Brown and Buckley's series of faunas of the Scottish areas, yet in manner of treatment, and in other features, with a character of thorough originality, it forms perhaps the finest faunal history that has ever been written on any district within the British Islands. The natural history portions of the two volumes of the 'Fur and Feather Series,' devoted respectively to the Partridge and the Grouse, were penned by our departed friend in 1893, and that on the Red Deer in 1896. The 'History of Fowling' (1897) was his latest and most voluminous book. In addition to these, Macpherson was responsible for a portion of the letterpress in the 'Royal Natural History,' he having supplied the account of the birds "from Corvidæ to Cærebidae." And similarly, in that fine work, 'British Birds, their Nests and Eggs, by various well-known Authors,' he was responsible for the Tubinares, which he described in his usual luminous style. He wrote the chapter on Ornithology for the Cumberland volume of the Victorian County Histories, but, alas ! it will appear as posthumous work. It is understood that an account of the avifauna of Skye, in which picturesque Hebridean island his ancestral estate of Glendale is situated, was nearly ready for the printer.

Such solid literary labours did not by any means exhaust his activity, for he contributed an immense amount of thoroughly good matter to magazines and newspapers. Since he has resided at Pitlochry he often furnished one of the excellent natural history articles that appear each Tuesday in the 'Scotsman.'

The Carlisle Museum in Tullie House has been more indebted to Macpherson than anyone else. The collection of birds was his especial care, and most admirably it has been completed, mostly with his own specimens, or those procured from friends.

In concluding this brief and inadequate memoir of one who stood far forward amongst British ornithologists, we may express the confident hope that a memorial volume, for which ample materials exist, may be forthcoming ere long.

R. S.

LIONEL DE NICEVILLE.

THE last Indian mail brought the sad news of the death, from malarial fever, of Mr. Lionel de Niceville, the eminent lepidopterist. For many years Mr. de Niceville worked unremittingly and enthusiastically at Eastern Lepidoptera, devoting special attention to the butterflies. His unrivalled knowledge, gained not only by a study of the literature of the subject, but by years of practical work and collecting in the field, he embodied in his well-known book, ‘The Butterflies of India, Burma, and Ceylon,’ which unfortunately he has not lived to finish. Numerous papers, however, in scientific journals testify to his industry and knowledge of Eastern butterflies. It is greatly to be regretted that only three volumes of ‘The Butterflies’ have been published. Vol. i. was written in collaboration with Col. G. F. L. Marshall; vols. ii. and iii. were written and published entirely by Mr. de Niceville. It was unfortunate that the volumes were only issued at long intervals, for, notwithstanding the popularity of butterflies with collectors, the work was published at a considerable pecuniary loss to the author.

Last year Mr. de Niceville accepted the post of Government Entomologist at the Indian Museum, and it was characteristic of him to enter on his work with the zeal and thoroughness he showed in all things. Indeed, his sad death is in a manner attributable to the keen sense of duty that led him, in spite of warnings from friends, as to the deadly unhealthiness of the Terai jungles in autumn, to proceed thither on purpose to investigate the ravages of insect-pests in the tea-gardens.

I do not attempt in this short notice any appreciation of Mr. de Niceville’s scientific work; I write of him simply as a friend whose untimely loss I, in common with the scores of friends he had in India, deeply deplore.

I made Mr. de Niceville’s acquaintance in 1888, and in the years that followed we were not only in constant correspondence, but he paid several visits to me in Burma. In 1891 he accompanied me for the first time into the forests in Tenasserim on a collecting trip, and a pleasanter fellow-traveller and more cheery companion it would be difficult to find. I shall never forget his almost boyish delight and enthusiasm on our first

day's march into the forests. It was a hot fine day in October following a week of rain, and the abundance of the varied insect-life of a tropical forest was marvellous to behold, and seemed to strike De Niceville, who had for months been confined to the drudgery of an office in Calcutta, with a delight quite inexpressible in words. How we rushed about that day, with net, bottle, and collecting-box in constant use, until far on in the afternoon, tired, dripping with perspiration, but still longing to continue collecting, we sat down on the bank of a little mountain stream to count our spoil. Even then De Niceville's thought was for others. Looking at the clouds of butterflies swarming on the sands at our feet, and flitting around us, he remarked:—"What wouldn't I give to have — [mentioning a mutual friend of ours at home—the very Nestor among lepidopterists] out here ; he would enjoy it so."

To so ardent a naturalist it was a labour of love to amass a vast collection, and to tend it with unremitting care. I am glad to learn that this valuable result of De Niceville's work has been acquired by the Indian Museum, where so much of his best work was done.

C. T. B.

NOTES AND QUERIES.

MAMMALIA.

Materials of Dormouse's Nest.—Examination of a large number of nests has proved that in this neighbourhood the nests are constructed of honeysuckle-bark—long coarse strips outside, fine threads inside. Occasionally dead leaves are added, but no grass. The nests are never far from where there are clumps of honeysuckle growing. As the dead bark would hardly be obtainable in quantity till the fall of the year, does not this fact lend colour to the suggestion made by Mr. T. Vaughan Roberts, that *Muscardinus avellanarius* usually litters in autumn, not in spring, as so generally supposed? That such a question should arise shows once more how little we know as to the "family affairs" of our familiar native mammals.—H. E. FORREST (Shrewsbury).

AVES.

Wood-Warbler (*Phylloscopus sibilatrix*) in the Isle of Man.—On May 29th last, when visiting Rhenass Glen, I listened for some time to the familiar song of this bird. The plantation, which is a comparatively new one (probably formed about sixty years ago), seems very suitable to the habits of this species, and I have no doubt that at least one pair was nesting there. I think this bird has not been noticed in the Isle of Man before.—FRANK S. GRAVES (Ballamoar, Alderley Edge).

Marsh-Warbler in Somerset.—I was pleased to see from Mr. Horsbrugh's note (Zool. 1901, p. 472) that the Marsh-Warbler (*Acrocephalus palustris*) is in evidence as a breeding species in the neighbourhood (presumably) of Martock. During the years 1888 to 1892 I came across several nests about seven or eight miles from Martock (cf. Zool. 1889, p. 450), and previous to that it was known to breed near Bath and Taunton. I have not visited in the nesting season the precise locality where I met with it since 1892, but doubtless it is still to be found there, and possibly in increasing numbers. At all events, it is satisfactory to learn from another observer that it is to be found breeding only a few miles off.—ROBERT H. READ (Bedford Park, London, W.).

Differences between immature Blue-headed and ordinary Yellow Wagtails.—Can any reader give some definite characteristics to distinguish immature birds of the Blue-headed Wagtail (*Motacilla flava*) from those of the ordinary Yellow Wagtail (*M. campestris*) ? Mr. Howard Saunders, in his 'Manual,' apparently regards the white eye-stripe as the distinguishing feature of *M. flava*. Dr. Bowdler Sharpe describes this eye-stripe as "tawny buff," and winds up with the statement that "young birds of *M. flava* are scarcely distinguishable from those of *M. campestris*." During the last three autumnal migrations I have paid considerable attention to the point, and it would be interesting to see if the experience of others in any way coincides with my own. In September, 1899, I was looking out for *M. flava* amongst some flocks of *M. campestris* on the Norfolk coast. I scrutinized these flocks daily through strong glasses, and at last encountered a bird which struck me at once as being different to the ordinary run. Seen at a distance, it appeared darker above, especially about the head. I shot it and set it up, and may mention that a good judge, who saw it, momentarily took it for a Grey Wagtail. I showed it afterwards to Mr. J. H. Gurney and Mr. Southwell at Norwich, both of whom agreed that it was a specimen of *M. flava*. The eye-stripe was light tawny buff, and the throat white; the upper parts of the head and back dark greenish grey, not brownish. Against this darker ground the light margins of the wing-coverts and tertaries showed up more than in *M. campestris*. In September, 1900, I was at Aldeburgh, and Yellow Wagtails were abundant on Thorpe Mere. I shot one or two to compare with my Norfolk bird, but once only saw anything to remind me of it; and this bird I failed to secure. Last year I was again in Norfolk, and came across a Wagtail which, as it ran, reminded me of the 1899 bird. I shot it, and have since compared the two. The later one agrees exactly in the hue of its upper parts and dark head; the eye-stripe is ill-defined but light, while the throat, though light, is certainly not so white as in the former bird, but has a yellowish tinge, especially at the sides. Still, comparing them with my Yellow Wagtail, I believe that they are both specimens of *M. flava*, and would suggest that the real difference between the two species at this age lies in the different hue of the upper parts, especially the head. The natural fading of a stuffed bird will doubtless soon reduce both eye-stripe and throat to white, and I cannot help thinking that these distinctive marks have in consequence been overrated, and that *M. flava* is a commoner bird in autumn than has been supposed; but that, as in the case of the Marsh-Warbler, an eye to variation in the shade of colour is the main requisite for its detection. In the Pied Wagtail

many of the parts that are white in the adult are suffused with yellow in the immature bird. May not the same be the case with the eye-stripe and throat of *M. flava*?—E. C. ARNOLD (The Close, Winchester).

Red-throated Pipit in Sussex.—I happened to be in the shop of Mr. G. Bristow, taxidermist, of St. Leonards, on the morning of Nov. 30th last, when a Pipit was brought in (in the flesh), which we believed to be *Anthus cervinus*. After the bird was mounted I sent it to Dr. Bowdler Sharpe at the British Museum, who kindly confirmed our identification. The bird was shot in a garden at Ninfield, Sussex, on Nov. 26th, 1901. It proved on dissection to be a female. It was exhibited at the meeting of the British Ornithologists' Club on Dec. 18th, 1901, by Mr. Howard Saunders.—L. A. CURTIS EDWARDS (31, Magdalen Road, St. Leonards-on-Sea).

Waxwings at Great Yarmouth.—During the latter part of November, 1901, Waxwings (*Ampelis garrulus*) were unusually numerous in the neighbourhood of Yarmouth. Mr. Lowne, taxidermist, had over a dozen for preservation. The majority seemed to be immature birds. A. PATTERSON (Ibis House, Great Yarmouth).

The Tree-Sparrow in Cardiganshire.—While nothing is definitely known of this species (*Passer montanus*) in Western Wales beyond the certainty of its being uncommon, there is a strong probability that it has often been overlooked. I met with it for the first time in this district on Dec. 20th last, when I clearly identified four individuals, which were feeding with Chaffinches, Greenfinches, and a Bramble-fin in a stackyard at Clarach, about a mile north of this town.—J. H. SALTER (Aberystwyth).

Nutcracker in Herefordshire.—A specimen of the Nutcracker (*Nucifraga caryocatactes*) was obtained in September not many miles from Hereford, and is now to be seen in the Cardiff Museum. There are reasons for not giving the exact place. So far as I can learn, the species has not been recorded from any of the neighbouring counties. H. E. FORREST (Shrewsbury).

Great Black Woodpecker.—At the beginning of December I noticed a letter in the natural history column of a local weekly paper, written by a gentleman from Kington, Herefordshire, and entitled “A Strange Bird.” From reading the contents I conclude that the writer has had the good fortune to see a specimen of *Picus martius*, whose claim to a place in the list of British Birds is much disputed. The following is a copy of the letter:—“On Sunday morning, Nov. 24th, my wife and a lady visitor called my attention to the peculiar movements of a bird on

the trunk of a large sycamore in our grounds at the front of the house. In size and colour it looked like a Crow, but its beak was longer, and I could not reconcile the Woodpecker habits to such a large and well-known bird. We watched it for some time going round and round the trunk, picking, no doubt, its food from the crevices in the bark. At last it flew down upon the grass, and was lost to view among the shrubs. Being Sunday, I would not use my gun ; otherwise I certainly would have endeavoured to secure a bird which I had never seen before. We have kept a sharp look-out since, but our new visitor has not appeared again. We have a large variety of birds in this county well known to us, but, as this is a decided stranger, I would be glad if any of your readers could give me its name. I may say that there was a keen frost at the time, and an adjoining meadow was nearly covered with ice." Strange to say, several of the previous reported occurrences of *Picus martius* have come from Herefordshire ; and in the 'Birds of Breconshire,' by Mr. E. Cambridge Phillips, its appearance in that neighbouring county is recorded (Zool 1885, p. 305). — G. TOWNSEND (Polefield, Prestwich, near Manchester).

Yellow-billed Cuckoo in Somerset.—On Oct. 6th, 1901, a bird of this species (*Coccyzus americanus*) was shot at Pylle, in Somerset, and forwarded to me for identification. It was in perfect new plumage, bearing no traces of confinement, and proved on dissection to be a female. Heavy westerly gales had been blowing on that and the previous day, which doubtless brought this American visitor in from the Bristol Channel. I exhibited this specimen at the November meeting of the British Ornithologists' Club, and note since then that Mr. G. B. Corbin records another specimen from Hampshire, also in October. A specimen was found in 1900 on the shores of the Menai Straits, also in October, and of the six or seven previously recorded British specimens, all of them of which the dates of captures have been preserved have occurred in the month of October, beginning with October, 1825. The species is migratory in the United States, like our own Cuckoo is in Europe, and from the fact of all the British-taken specimens occurring in the month of October, it is fairly evident they are not escapes from confinement. They are doubtless wanderers which have lost their way, or been blown out to sea during their autumnal migration, and, by the help of westerly gales and possibly assisted passages on the rigging of vessels, have been enabled to reach these shores. They should, I think, therefore fairly claim a place on the British list as "accidental visitors."—ROBERT H. READ (Bedford Park, London, W.).

Kingfisher near Aberdeen.—The most interesting ornithological event here is the recent acquisition of a Kingfisher (*Alcedo ispida*) on the Don, a few miles inland from Aberdeen. A second specimen was picked up in a starving condition about twenty-five miles inland, at the watercourse of Moutgarrie grain-mills, Alford, Aberdeenshire.—W. WILSON (Alford, Aberdeen, N.B.).

Shoveler in Herts.—A female specimen of the Shoveler (*Spatula clypeata*) was shot on a pond near here, in company with some ordinary ducks, on Dec. 2nd last; it was in splendid condition. As far as I can gather, this is the first time the species has been recorded from Herts. The bird was given to me, and sent to Messrs. Watkins and Doncaster for preservation.—HENRY JENNINGS (42, Marlowes, Hemel Hempstead, Herts).

King-Eider in Fifeshire.—A male King-Eider (*Somateria spectabilis*) was shot on a moor in Fifeshire on June 15th, 1899. It was in company with Common Eiders, which breed on the moor in considerable numbers. I saw the bird the day after it was shot.—BERNARD B. RIVIERE (82, Finchley Road, N.W.).

Red Grouse in Surrey.—Can any reader tell me whether Red Grouse have ever been turned down in Surrey besides those mentioned in Bucknill's 'Birds of Surrey,' viz. by the Duke of Gloucester in 1829, and by Colonel Chaloner at the beginning of last century? The reason I ask, is that an old inhabitant of Chobham, in Surrey, told me, with many particulars, that he had once seen some on Chobham Common some thirty years ago. If none have been turned down since 1829, he must surely have made a mistake, as otherwise they would have been noticed by other people between 1829 and 1870. He knows the difference between Red Grouse and Black Grouse, which he has also seen on Chobham Common, but which, I think, are now extinct.—S. H. LE MARCHANT (44, Pont Street, S.W.).

Nesting of the Moor-hen (*Gallinula chloropus*).—In 'The Zoolologist' (1901, p. 17) there appeared a very interesting article on the nesting of the Moor-hen by Mr. Oliver G. Pike, in which the writer points out a curious fact concerning the extra nests built by these birds. In a pond near here a pair of Moor-hens build every year, and on one occasion I noticed two other nests built in the reeds at the side of the pond, one at about fifty yards and the other about one hundred yards from where they had constructed their proper nest, which is usually on a small island in an overhanging rhododendron-bush, about six inches from the water. This nest was neatly built of small twigs, and lined with grass and leaves in the usual way; the other two nests

were quite different, being made in the reeds, and were constructed by twining them in and out until a small platform was made about eight or ten inches in width, and about five or six inches high. These nests were never lined, and must have been, as Mr. Pike says, used as a roosting-place for the young birds. I think the strangest circumstance is that they were built so differently from the real nest, and Mr. Pike does not say whether he noticed this point or not. It is a well-known fact that Wrens build a number of false nests, very much after the fashion of the Moor-hen; but I have never heard of these being used for any purpose. The Rev. J. C. Atkinson, writing in 'The Zoologist' (1844), p. 767, on the second nests of these birds, says, occasionally constructed "to accommodate a moiety of its young when they have attained a size too large to permit the original one to contain them all. And when the colony is sent to the second nest, one of the old birds accompanies it. An instance of this habit occurred in the vicinity of my father's residence when I was last at home. The female Moorhen was the architect, and the subsidiary nest she busied herself in constructing was built on a bough overhanging the water." Mr. Atkinson, in his little book on Birds, Nests, and Eggs, also records this fact. W. H. WORKMAN (Lismore, Windsor, Belfast).

Unusual Nest of the Ringed Plover (*Ægialitis hiaticula*).—Scores



of Ringed Plovers nest on the gravel sea-banks which nearly surround a four hundred-acre farm in the neighbourhood of Portsmouth, some-

times in the fields as well; and, as is their wont, when laid in the latter situation, the eggs are surrounded with small pebbles or pieces of shells; but the following nesting arrangement I venture to think very rare, and should much like to know if any of your correspondents have met with a similar nest. On May 26th, 1900, I found, in a ploughed field, a rude nest, constructed of bents, resembling that of the Lapwing, only smaller; this contained three eggs of the Ringed Plover. The ground on which it lay was about to be harrowed, so I removed the eggs. On June 14th I found a similar nest (evidently the work of the same pair of birds) a short distance from where the first had been constructed, but this one was placed in a patch of coarse grass, and contained four Ringed Plover's eggs. I am aware that Col. Feilden describes a nest of the Ringed Plover lined with the leaves and stems of *Atriplex littoralis*, but this was found abroad, and referred to the small variety of Ringed Plover.—J. E. H. KELSO (67, Elm Grove, Southsea, Hants).

On the feigning of Injury by the Lapwing (*Vanellus vulgaris*) to attract attention from its Young.—Whilst looking through some back volumes of 'The Zoologist,' I noticed (1897, p. 473) the statement, "that sitting Lapwings (that is, females) decoy intruders from their nests by their devices," described as an ornithological fallacy. I conclude that by the word "devices" the writer refers to the feigning of injury usually attributed to that bird. Mr. E. Selous appears to be equally sceptical upon this subject, for in his book 'Bird-Watching' (p. 66) he writes:—"Perhaps it may be wondered why I have not included the Peewit in the list of birds which employ, or appear to employ, a ruse in favour of their young ones, since this bird is always given as the stock instance of it. The reason is that whilst the birds I mention [Nightjar, Mallard, &c.—B. B. R.] have always, in my experience, gone off, so to speak, like clockwork, when the occasion for it arrived, I have never known the Peewit to do so, though I have probably disturbed as many scores—perhaps hundreds—of them, under the requisite conditions, as I have units of the others. I have also inquired of keepers and warreners, and found their experience to tally with mine. They have spoken of the cock-bird 'leading you astray' aerially, whilst the hen sits on the nest, and of both of them flying with screams close about your head when the young are out, which statements I have often verified. But they have never professed to have seen a Peewit flapping over the ground as with a broken wing in the way it is so constantly said to do. I cannot therefore but think that by some chance or other an action, common to many birds, has been particu-

larly, and yet wrongly, ascribed to the Peewit." As we have here two experienced observers expressing their disbelief in the fact that the Lapwing ever employs the ruse of "shamming wounded" on behalf of its offspring, I thought the following incident worth reporting, as evidence in the opposite direction :—On May 30th of this year (1901) I was walking along the bank of an old disused canal, bounded on either side by a considerable stretch of flat marshy ground, upon which a number of Lapwings breed. As I approached a certain spot I noticed a pair of these birds becoming tremendously excited, flying backwards and forwards past me in a manner so characteristic of them when their young are hatched, and crying incessantly. When I thought I had reached the place about which they seemed most anxious, and near where the young were probably lying hidden in the grass, I stopped, and immediately both birds alighted on the ground close to me, with wings spread and hanging down brushing the ground, and each began running along, constantly toppling over on to one shoulder, with wings flapping feebly upon the ground, exactly as if injured. When I approached them they immediately flew up, and began flying backwards and forwards again close to my head ; but when I stopped they again settled, and went through the same performance. There was no doubt about the simulation of injury, and I think this conclusively proves that the Lapwing does—at all events, upon occasions—employ this well-known deception to protect its young, though in the case of these birds the instinct did not seem to be a highly perfected one, as when approached they gave up the deception, and did not attempt to decoy me further. I have never before seen a Lapwing act in this manner, and had always myself been sceptical upon the point. Mr. E. Selous, in 'Bird Watching,' discussing the possible origin of this interesting piece of acting in birds, suggests that the performance might have been originally due to a sort of hysteria and loss of mental balance caused by the shock of being suddenly disturbed from the nest, after sitting still for a long time, and that this has been acted upon by Natural Selection, "aided by the intelligence of the bird in perceiving the advantage of such a performance," until it has become an "instinct" or habit. But I have often thought it might have arisen from birds being seized with actual cramp from long sitting, this having been acted upon by Natural Selection in the same manner ; and it seems to me quite possible that even some of the cases one meets with to-day of birds fluttering along the ground as if wounded, when put off their nests, may be attributable to temporary cramp from long sitting in the same position.—BERNARD B. RIVIERE (82, Finchley Road, N.W.).

Notes from Wilsden, Yorkshire.—From observations extending over many years, I think that there cannot be any reasonable doubt, so far as this district is concerned, that a separation of sexes of many species of birds occurs on the approach of winter. A very large proportion of Sparrows which come to be fed in our garden are male birds—at least, not more than one female to three or four males—and the proportion of male Blackbirds is even greater; and this remark applies not only to those which frequent our garden, but to the whole district. It is hardly needless to refer to the Chaffinch, as this habit is so well known. We very seldom see a female here from early December to early February. Of the many other species which frequent the garden, the differences in the sexes being less striking than those already mentioned, make it a much more difficult matter to determine with any degree of certainty the relative proportion of the sexes in winter. It is, however, hardly likely that migration of females will be confined to the above-named species. Even amongst the class of birds which are so called “residents,” it is, and has long been, a belief with me that there is much more migratory movement than has been generally acknowledged by ornithologists. I was called to look at a bird the other day which had been shot in the immediate neighbourhood, which proved to be a Hawfinch, a species whose status in our local avifauna has changed of late years, perhaps more than any other British bird. Speaking of this species, Mr. Jenyns, in his Manual published in 1835, says:—“Only an occasional visitant in this country during the winter months. Principally observed in the southern countries. In a few instances has been known to remain and breed. Feeds on haws and other stone fruits.” Here, I think, it is commoner in summer than winter. We found last summer two nests in Wharfedale, almost in the identical places we found two in the year 1900. On dissection the above bird was found to have been feeding on wheat, which is somewhat curious, when what one would have thought its more natural food was abundant in the locality where it was shot. Another friend recently called here—a caretaker of one of the Bradford Corporation reservoirs—and gave a description of a bird he and another man had seen flying about the vicinity of his residence about the month of last September or October, which could be no other British bird than the Golden Oriole. We are quite aware how unreliable such descriptions usually are when given by casual observers, but this species is so very striking that, even allowing for a liberal dash of inaccuracy, it would be difficult to confound with any other bird. A race, if not a species, of Wren, differing from the Wren which nests here, is met with occasionally in early autumn on our high moors, and are evidently

immigrants. They are much larger, and may be the St. Kilda Wren; anyhow, they keep more to the high ground, and are not nearly so arboreal in their habits as the common species. It is, however, more probable that they may have been bred on some other of the isles of North Britain.—E. P. BUTTERFIELD (Wilsden, near Bradford).

Rare Birds in Surrey.—The following birds have lately passed through the hands of Mr. Bradden, the Guildford taxidermist:—A Golden-eye (*Clangula glaucion*), female, shot at Shamley Green, near Guildford, Nov. 17th, 1901; a Spoonbill (*Platalea leucorodia*), female, procured at Claudon Park, Nov. 26th, 1901; and a Storm-Petrel (*Procellaria pelagica*), male, caught alive at St. Catherine's, Guildford, by police-constable Turner, flying at lighted lamp, Dec. 28th.—GORDON DALGLIESH (Inglefield, Milford, near Godalming, Surrey).

Birds of the Isle of Man.—Being engaged in the collection of material for a work on Manx birds, I will gratefully receive and acknowledge information bearing on the subject; or references to books, periodicals, &c., in which such occur, and which may not have come under my notice.—P. RALFE (Castletown, Isle of Man).

NOTICES OF NEW BOOKS.

Zoology: an Elementary Text-Book. By A. E. SHIPLEY, M.A., &c., and E. W. MACBRIDE, M.A., &c. Cambridge: at the University Press.

"WE have tried in the following book to write an elementary treatise on Zoology which could readily be understood by a student who had no previous knowledge of the subject." This is the opening sentence of the preface. The word Zoology "denotes the science which concerns itself with animals, endeavouring to find out what they are, and how they came into being," is the definition given in the introduction. These two statements may be taken as admirable texts to a volume which should be in the hands of those many naturalists who are not in the strict sense zoologists.

After discussing the "fundamental" difference between animals and plants, which after all is perhaps less fundamental than relative, we come to a most pregnant sentence, which will well bear repetition and remembrance: "Since we can never learn much about the consciousness of beings with whom we cannot speak, zoologists content themselves with looking at animals entirely from the outside, without enquiring as to whether or no they are conscious." We believe that a communication with animal life will be the great zoological discovery of the future, though at present scarcely a single experiment is being made to aid a work which, like meteorology, can only make a start on the results of experiments and observations continuously made, and frequently verified. The very statement of our disability through this cause to really understand other animal life than our own is at once a mark of progress.

In reading these pages one cannot but appreciate the loss to bionomics that accrues by the neglect of observations on many lower forms of life. If we except the Phylum *Arthropoda* and the higher vertebrates, we shall find this volume describing

animals which seem totally neglected by field naturalists. How many have observed a Starfish in the act of devouring a Mussel, of which an excellent illustration is given? (p. 241). A little practical zoology will also guide our observations and conclusions. All of us who have hunted Crocodiles will remember the sometime unpleasant proximity of the tip of snout, and that only to be seen, of one of these submerged saurians close to the small and deeply-laden canoe; but do all remember that this ruse is only possible by the fact of the choanæ or posterior nares being "situated very far back directly over the glottis, whilst the external nostril is at the tip of the snout"?

A feature in the classification is that of a large Sub-phylum of the Phylum *Vertebrata*, designated *Craniata*, distinguished by possessing a skull and brain. This is again divided into two divisions, that styled *Gnathostomata* including *Pisces*, *Amphibia*, *Reptilia*, *Aves*, and *Mammalia*. However, classifications are only propositions; but in studying these we frequently discern affinities of which we had no previous cognizance, and differences of whose existence we were ignorant. Our space debars further reference to this most interesting and important volume.

The Protozoa. By GARY N. CALKINS, Ph.D. New York :
The Macmillan Company.

IN a hidden world—at least beyond the range of our unaided vision—live the Protozoa, unicellular organisms “not far removed from the colorless bacteria on the one hand, and the primitive green plants on the other.” In the earlier works of Linnæus the existence of these animals was treated with complete scepticism, though in the later editions of the ‘*Systema Naturæ*’ they were admitted under the significant generic name *Chaos*. Why, to-day, are these creatures so neglected by zoologists? Some are even known to menace the life of man, but it would be as difficult to find an ordinary child who was ignorant of the existence of the Tiger, as to discover one who could define what was meant by a *Protozoön*. The Protozoa are also of indirect injury to humanity. Among the Sporozoa the Sarcosporidiida produce morbid symptoms in domestic animals often leading to death, while

the Myxosporidiida are a deadly scourge to fish and silkworms. Then again their relation to the problem as to whether plants and animals in primitive forms are capable of demarcation is a most important one, for, as Dr. Calkins points out, Buffon wrote as early as 1749 : " We are led to conclude that there is no absolute and essential distinction between the animal and vegetable kingdoms."*

We might further digress on the many interests attached to the Protozoa. What are the bionomics of these living unicellular structures; and has not immortality been ascribed to their method of reproduction by simple division? But we will refer all enquirers to the book itself. It is a volume which describes what to most people is an unknown life in an unseen world, and is another instance of the good work now being done in America.

The Birds of South Africa. By ARTHUR C. STARK, M.B.; completed by W. L. SCLATER, M.A., F.Z.S. Vol. II. R. H. Porter.

THE second volume of this excellent monograph has appeared, and possesses a somewhat melancholy interest. Dr. Stark, the original author, and whose portrait is given as a frontispiece, was slain by a Boer shell during the siege of Ladysmith. The manuscript that was left behind by the deceased ornithologist has been placed in the hands of the Director of the South African Museum, who, with necessary revision and additions, has produced this volume, and will, we are glad to learn, bring the work to a conclusion in two final volumes.

The present publication continues the description of the Passeres, commencing with the *Laniidæ*, and concluding with the *Pittidæ*. It thus includes the Warblers, a group which in the Transvaal the writer of this notice found was very imperfectly known, and probably insufficiently collected. These birds only attract the attention of the earnest ornithologist, and as a rule

* This view must have had considerable vogue in France, and is probably the derivation of the remark lately attributed by Lord Rosebery to Napoleon—"The plant is the first link in a chain of which man is the last" ('Napoleon, the Last Phase,' p. 170).

are passed over by the ordinary collector; so that it is still probable for the present enumeration to be extended. If instructions were given for these small birds to be sent home in spirit much more would be known about them; for the tired waggon-traveller to keep awake and skin these small creatures is a thing to be hoped for rather than expected. In all orders, the smaller the species the more difficult to acquire—at least, in South Africa, where many a good sportsman, both Boer and Briton, will cheerfully take the trouble to procure you an animal of size, but will resent being asked to collect and skin Warblers.

We have heard of pianos accompanying our military columns to help while away the monotonous expeditions over a lonely veld. We would propose that this series of faunistic books should be supplied to every mess-room, whether peripatetic or otherwise. They are volumes that will be appreciated by every naturalist in our South African colonies, and especially by our military men who are now traversing the whole of a region yet somewhat imperfectly known to ornithologists.

Photography for Naturalists. By DOUGLAS ENGLISH.
Iliffe & Sons, Limited.

NATURE is ever seeking to be revealed. Sometimes she appears in the verse of Wordsworth, on another occasion in the magic prose of Ruskin, while painters have even often attempted to improve her on the inspiration of successive schools of art. Among naturalists a higher criticism is arising, a desire to see her portrayed as she is, or as she is to our perceptions. Photography is now invoked by the zoologist rather than the handwork of the artist, and the results, great as they are now, exhibit a still greater potentiality in the future. The present volume is designed as a means to that end, though it largely advocates a photography of natural objects “by control”—in other words, to photograph animals in captivity after making the artificial surroundings to look as natural as possible. This we consider a retrograde step, and one photo of an animal at large, and unaware of the attentions of the camera enthusiast, must surely

be in every respect more close to nature than the scared or enraged appearance of caged animals; our sympathy is altogether with the Rat and its efforts to frustrate the intentions of the photographer, as described (pp. 38-41).

The illustrations in this book are of the most instructive character, those of fish and "twenty years a cat" being exceedingly successful. But for charm and beauty these pale before the lovely photographic landscapes taken by Mr. Charles Job, of which six appear in this volume.

A Ready Aid to distinguish British Wild Birds. By DAVID T.
PRICE. Gurney & Jackson.

WE presume that this small publication is not addressed to ornithologists, by whom it might receive scant welcome, and we write this opinion in a mollient and not aggressive sense. It is apparently intended for those living in the country, who have little knowledge—if any—of the bird-life around them, who never acquired the wild lore of the schoolboy who happily nested and trespassed in many well-remembered nooks and preserves. Its usefulness may be found in its limitation; for those who know nothing, or next to nothing, about birds, after reading these pages, will probably go farther and seek to know more. The information given is concise, so far as the necessary superficial description is concerned.

EDITORIAL GLEANINGS.

In the December number of 'The American Naturalist,' Dr. H. W. Rand has given an extended abstract of Friedenthal's experimental proof of blood-relationship.* The blood of the Cat and the Ocelot is physiologically equivalent. The carotid arteries of these two animals were connected so that an exchange of blood took place from one to the other. No hemoglobin appeared in the bladder of either animal. But if a Cat and a Rabbit be connected in the same way, both animals die in a few minutes from the poisonous effects of the foreign blood upon the central nervous system. The effect of human serum was tried upon the blood of six species of Apes—(*Platyrrhines*), *Pitheciurus sciureus* and *Ateles ater*; (*Catarrhines*), *Cynocephalus babuin*, *Macacus sinicus*, *M. cynomolgus*, and *Rhesus nemestrinus*—at the Berlin Zoological Garden. In all cases the human serum dissolved the Ape corpuscles. Among the true Anthropoid Apes is found blood which is physiologically equivalent to that of man, as was proved by experiments made with an Orang-outang, a Gibbon, and a ten-year-old Chimpanzee, just as the blood of such widely separated races as the negro and white is physiologically equivalent. The writer concludes that such experiments justify the placing of man and the Anthropoid Apes together in the same family, "or at least in the same suborder, rather than isolating man in a suborder of primates, coördinate with the suborders of the Platyrrhines and Catarrhines."

At a meeting of the Zoological Society on Dec. 17th, 1901, a communication was read from Mr. G. Metcalfe, M.A., of New South Wales, concerning the reproduction of the Duckbill (*Ornithorhynchus anatinus*). The author stated that he was of opinion, after many years' observation of the animal, that the Duckbill was viviparous, and that the young were not, as was generally supposed, hatched from the eggs after they had been deposited.

We have received from Cairo, 'Notes for Travellers and Sportsmen in the Sudan.' "Published by Authority." This will prove a most

* "Ueber einen experimentellen Nachweis von Blutverwandtschaft," 'Archiv für Anatomie und Physiologie,' physiologische Abtheilung, Hefte 5 und 6, 1900.

useful guide to naturalists or others proceeding to Khartoum. Routes and expenses are detailed. There are several restrictions. Anyone wishing to take skins, horns, &c., of any ruminant through Egypt must obtain a special permit, and the specimens must be packed in hermetically and Government-sealed tin-lined boxes or tins. Live ruminants—in consequence of the possibility of cattle plague being introduced—can only be exported *via* Suakim.

MR. GEORGE WATSON COLE, of New York, has sent us a privately printed Bibliography of the scientific results obtained by the 'Challenger' Expedition at and near Bermuda. To students of insular faunas this digest should prove a very great convenience.

LORD CURZON, whilst on his recent tour in Burma, gave an interesting reply to an address from the Burma Game Preservation Society. Speaking of game preservation in India and Burma, he said that, though he yielded to no one in his love for sport, he had to look at the question in the public interest, and he had no doubt that wild life in India was on the decrease. Thus Lions were shot in Central India up to the Mutiny; they are now confined to an ever-decreasing patch of forest in Kathiawar. Except in the native States, the Terai, and the forest preserves, Tigers are undoubtedly diminishing. The Rhinoceros is all but exterminated, except in Assam. Bison are not so numerous nor so easy to obtain as they once were. Elephants have already had to be protected in some parts; above all, Deer are rapidly dwindling, and many beautiful and harmless varieties of birds are pursued for their plumage. The causes of all this decrease in the wild life in India are various; some are natural in consequence of the increase of cultivation and population; others are artificial, such as the great increase in the number of persons carrying firearms of range and precision, the depredations of native hunters, and the shooting of immature animals and females. Some argued that wild animals were bound to disappear in India as surely as Wolves had in England, while others said that India was so vast, and had such large forest preserves, that wild animals may safely be left to look after themselves; but he did not agree with either of these propositions. Wild animals, he said, must not be fostered at the expense of the people, and the cultivator must have reasonable means of protection. The Government, hitherto, have not been very bold in their legislation; Elephants have been protected, a close season for certain kinds of

game has been instituted, certain wild birds have been protected, and certain classes of animals have been protected in certain forest tracts. Whether these various measures may not be carried a little further was a matter which he promised to investigate. It was impossible to lay down rigid rules, for what was useful in one place might be injurious in another. A restriction on carrying arms by the imposition of a licence fee, the enforcement of a close season in regard to particular animals, restrictions on the facilities given to strangers to shoot game, and on the export of trophies and skins, were, he thought, matters worthy of consideration, and the Government would probably proceed on these lines.—*Shooting Times*.

WE have received, with the greatest regret, the news of the death of Dr. T. Thorell, the distinguished arachnologist. Dr. Thorell was born in 1830, and died on December 23rd, 1901, at Helsingborg, Sweden.

IT has previously been remarked in these pages that 1901 might be called the "Okapia year." We have now received 'The Song of the Okapi,' written by the veteran Secretary of the Zoological Society, Dr. P. L. Sclater, and set to suitable music.

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NOTES ON THE SEAL AND WHALE FISHERY OF 1901.

By THOMAS SOUTHWELL, F.Z.S.

THE Newfoundland sealing, although as a whole fairly successful in the past season, presented some interesting features which will be referred to farther on. The number of steamers which left port was twenty—an increase of one, namely, the 'Southern Cross,' which made her first sealing voyage, having been purchased by Messrs. Murray and Sons on her return from her Antarctic exploration voyage of 1899–1900; but, as the 'Hope' came to an untimely end, the number actually employed was the same as in the season of 1900. Of these, four vessels went to the Gulf fishery; the rest to the east coast.

The usual day for the departure of the steamers is the 10th of March, but that day falling on Sunday in 1901, the vessels took their departure on the 9th, and, finding the young Seals almost at once, some very speedy returns were the result. The first to arrive was the 'Southern Cross,' which reached Harbour Grace on the 20th of March, after an absence of only nine and a half days, with a cargo of 26,563 Seals; she was quickly followed by the 'Aurora,' which arrived at St. John's on the morning of the 22nd, heavily laden with the produce of 32,407 old and young Harps and Hooded Seals; others arrived in rapid succession. The 'Southern Cross' reached the whelping ice, some eighty miles north by east of the Funk Islands, on the morning of the 12th March, and had the monopoly of the locality for some time;

this enabled her to load up very rapidly with young Harps, of which she killed 26,361, and only 202 old Seals. She was thus quite independent of the Hooded Seals, of which most of the other vessels went in search after taking in the young Harps; hence her speedy return, making what I believe was the most rapid voyage on record. On her homeward voyage she experienced a fearful storm on the night of the 19th of March, and sought shelter at Perlican, where she was nearly driven on shore, and had to beat about the bay all night, but reached Harbour Grace in safety next morning. The 'Aurora' also made a very successful and rapid voyage; she met with bad weather, but struck the main patch on the morning of the 12th. By the night of the 15th, although she had been joined by other vessels, which took their share, she had taken on board 25,000 Harp Seals, and then departed in a north-easterly direction in search of the Hooded Seals, coming up with them on the afternoon of the 18th. Between that time and the morning of the 20th she had secured 7000. The latter part of the voyage would have been unnecessary, but that, less fortunate than the 'Southern Cross,' she lost seventy-two "flags," representing some 10,000 Seals; it is said these were unfairly appropriated by other vessels fishing in the neighbourhood. Unfortunately this is not the only complaint of a similar character which has been heard of this year. The result of her voyage was 25,210 young and 306 old Harps, and 4020 young and 2871 old Hoods; the young Harps, like all those killed early in the season, being of very light weight. With regard to this, I shall have some observations to make later on. The 'Nimrod' arrived on the 7th April with 13,055 Seals, and the 'Terra Nova' on the 23rd with 19,275; some 10,000 of these were old Harps and Hoods, some said to have been of enormous weight; her delivery was 650 tons net. All her old Seals were taken prior to the 8th of April, on which day she was beset and drifted about for some time in the vicinity of Groais Island. The 'Iceland' came in contact with an iceberg on the 11th March, sustaining considerable damage, and injuring two of her crew; but, as she was running slow at the time, a fatal disaster was avoided; she, however, secured 20,150 Seals. The 'Virginia Lake' was the most unfortunate vessel of this section of the fleet; on the 27th of March she was caught in the

ice near Groais Island, in the same locality as the 'Terra Nova,' and remained beset till the 6th of April, when, after much sawing and blasting of the ice, she got free, only to be again caught in the floe off Partridge Point (White Bay), remaining fast till the end of the month; finally, after sundry other adventures, arriving safely at St. John's on the 5th of May with 19,605 Seals.

The Gulf sealing was practically a failure. Four vessels, namely, the 'Harlaw,' 'Panther,' 'Kite,' and 'Hope,' took part in this section of the voyage; the 'Harlaw' and the 'Panther' only securing 400 and 4855 Seals respectively; the 'Kite' got jammed in the ice off Prince Edward's Island, and at one time was in a situation of great peril, but eventually reached Channel in safety on the 27th April with a cargo of 8216 Seals; of these 900 were old Harps and 400 old Hoods, which yielded a weight of fat and pelts about equal to 10,000 young Harps. From the 13th March to the 23rd she is reported to have killed twice the number of Seals she could possibly carry, but frightful weather setting in, she only succeeded in getting 7000 young Harps on board. The remaining vessel, the 'Hope,' was unfortunately driven on shore on Byron Island, one of the Magdalen group, and became a total wreck, with 5000 Seals on board. Happily her crew of 194 men landed safely on the island, whence they were subsequently rescued by the 'Greenland,' which departed from St. John's for that purpose. The 'Hope' was rather a notable vessel. In 1873 she sailed from Peterhead on her first whaling voyage, commanded by Capt. John Gray, a member of a family celebrated for generations as successful whalers, and was employed in 1882 in the rescue of the crew of Mr. Leigh Smith's yacht, the 'Eira,' which foundered off Cape Flora, Franz Josef Land, in the previous year; in 1892 she passed into the ownership of Messrs. Baine Johnson and Co., and has been since that time employed in the Newfoundland sealing.

In addition to the young Harps got in the Gulf fishery being, like those off the east coast, smaller than usual, the failure of the fishery in this locality was also due to the heavy gale early in April which proved destructive to the 'Hope,' broke up the whelping ice, and either swept the young Seals into the sea, or separated them from their parents, so dispersing the pack that the steamers could not come near them in any quantity. Any

Harps that were got were in the western locality, those frequenting the eastern ice, once more, so far as Mr. Thorburn could learn, never having been seen. The same state of things prevailed with regard to the ice frequented by the Hoods, and with a like result.

The Newfoundland winter proved very severe, but after the latter end of January the weather moderated, and a fine spring followed. As there was very little drift-ice off the coast, a favourable sealing year was anticipated, and, so far as the early finding of the Seals was concerned, this was fully realized ; but, although killing commenced on the same day as last year, the young Seals were very much inferior in weight, averaging something like 35 lb. in fat and pelt against 50 lb. in the previous season. Mr. Thorburn, with his usual kindness, has been at some trouble to ascertain, if possible, the true cause of this falling off in weight, and he tells me that, in the opinion of several of the most experienced captains, it is mainly due to the fact that for some reason the Seals whelped some days later this year than last ; for instance, the people living in Belvoir Bay reported to Capt. Blandford that the old Seals did not go off from there so soon as usual in search of the whelping ice, which he considers sufficient evidence that they reproduced later than last year. Under favourable conditions the young Seals increase in weight from two to four pounds daily ; this rate of increase is not mere conjecture, but has been proved by experiment. It is, however, believed by many that mild weather retards their growth ; this has not been so fully established, but it is known that much rain causes them to leave the ice, and take to the water considerably earlier than they otherwise would. Another reason for the reduced average in weight is that the killing was all over in a very short period, leaving no time for the young ones to increase in weight, in which respect even a few days, as has been explained, would make a considerable difference. This is further borne out by the facts that those steamers which struck the Seals on the shore side of the whelping ice—that is to say, the south-west pack—(as is usually the case), secured heavier results than those fishing on the outside or north-east ice, owing to the Seals whelping in the former locality somewhat earlier than the latter.

A much larger number of old and young Hooded Seals were

got this year off the east coast than usual. To show the relative results of the two years, I give the returns for the last two seasons of the nineteen steamers:—

	No. killed.	Net weight.	Approximate value.
1900	353,276	7523 tons	£96,720
1901	345,380	6651 ,,,	77,819

On the same basis as last year the produce of 1901 should have weighed 7354 tons, a difference of 703 tons; whereas the actual difference was 872 tons, or a loss of 169 tons.

The 'Aurora' made the largest catch, *viz.* 32,407; the 'Neptune' next, with 27,628. There were eleven others above 15,000, and three others above 10,000, leaving two, the 'Kite' with only 8,216, and the 'Harlaw' with 453, both of which went to the Gulf fishery, which, as has been already explained, was virtually a failure. The average of the whole was 18,178, ten vessels having more than that number, and nine less. The estimated value of the produce, at about the same rate as last year, is given above. Pale Seal-oil was worth £23 per tun of 252 gallons.

The St. John's 'Evening Telegram,' commenting upon the immature quality of the Harp Seals brought in this season, advocates a further amendment of the sealing laws, with a view to postponing the departure of the ships until the 12th or 13th of March, pointing out the enormous loss incurred by the destruction of the extra number of small Seals killed to make up the weight of a full cargo; but, on the other hand, there are those who deprecate the too frequent alterations in the sealing laws, or the attempt to legislate for an abnormal season such as that just passed certainly was.

Since the season of 1897 only three Right Whales have been seen in the Greenland Seas by the Scotch whalers, two of which were killed. It is not surprising therefore that in the past season, for the first time for I know not how many years, not a single British whaler has visited the once prolific seas between East Greenland and Spitzbergen. Whether the Whales are actually worked out, or whether they will again be found when the ice returns to its normal condition in these seas—a change in which direction seems to have already set in—I cannot venture an opinion; but the fact remains that the once highly remunerative

industry, both as regards Seals and Whales, so far as the British vessels are concerned, has—at least, for the present—come to an end.

In Davis Straits, on the other hand, there was no scarcity of Whales, although, owing to the unfavourable condition of the ice and the prevalence of stormy weather, the success was not great. Five vessels left Dundee, and the 'Alert' from Peterhead, as usual, brought home produce from the Cumberland Gulf station. Of the five Dundee vessels, four fished in Davis Straits, and the 'Active' visited the trading station in Southampton Island, whence she returned with the produce of 5 Whales, 262 Walrus, and 76 Bears. Three of these Whales were killed in the spring at the station, and two in September by the 'Active'; but as the total yield is given as 25 tuns of oil, and 30 cwt. of bone, they must have been very small ones. Much time was lost by the 'Active' searching in Fox Channel, Fisher Strait, and the adjacent waters for the Yarmouth trawler 'Problem,' which, as will be mentioned farther on, was to have met her at the station.

The 'Nova Zembla' was the first Davis Straits vessel to arrive at Dundee on the 7th of October. She had experienced bad weather, heavy ice, and a succession of mishaps to her machinery. Several Whales were seen by her, but it was not till the 20th of July that she succeeded in killing her first and only fish at the middle fishing-ground; this was a very small one, yielding only about 4 tuns of oil and 3 cwt. of bone; after this no others were seen. In September she killed 418 White Whales in Cumberland Gulf, and with these and 26 Bears bore up for home. The 'Eclipse' had a most adventurous voyage, experiencing terrible weather from the time she left Dundee till her return on the 29th of October. When Whales were seen it was impossible to send the boats in pursuit, owing to the heavy ice; but at last she was rewarded by a fine Whale of 11 ft. 10 in. bone, and a month later a second was brought alongside; but so rough was the weather that the carcase was washed away before flensing was completed. Later on a third fine Whale was killed, and she started on her return voyage on the 11th of October with two Whales and part of a third, yielding 59 tuns of oil and 50 cwt. of bone: also 106 White Whales, 6 Walrus, 17 Seals, and 19

Bears. In addition to these the 'Eclipse' lost another very large Whale, which, after an exciting struggle, succeeded in breaking away.

The 'Diana' was the next vessel to arrive. She killed her first fish on the 29th of June, and then proceeded to Lancaster Sound in search of White Whales. Here, however, the ice was so heavy, and the weather so boisterous, that little could be done, and she narrowly escaped destruction on two occasions from ice pressure, and was glad to escape from so dangerous a locality. The next Whale she met with, and that a very large one, broke away after receiving three harpoons; and it was not till the end of October that a second fish of much smaller dimensions was secured. Her total produce was 2 Whales, 110 White Whales, 1 Walrus, and 20 Bears, yielding 47 tuns of oil and $38\frac{1}{2}$ cwt. of bone. The last vessel to arrive was the 'Balæna,' with 2 Right Whales, 104 White Whales, 2 Walrus, 3 Seals, and 8 Bears, producing 46 tuns of oil and 36 cwt. of bone. The 'Alert' brought from the Cumberland Gulf station the produce of 2 Black Whales, 149 Walrus, and 3420 Seals, equal to 40 tuns of oil and 6 cwt. of bone; including which the total return for the season amounted to $14\frac{1}{2}$ Black Whales, 738 White Whales, 420 Walrus, 3420 Seals, 149 Bears; equal to 260 tuns of oil and $163\frac{1}{2}$ cwt. of bone.

The present price of produce is £22 10s. for oil. There are so many grades of Walrus hides that it is difficult to estimate the value of the bulk, but the price has gone down considerably. White Whale hides have realized very good prices. One sale of bone has been effected, I am informed, at the rate of £1450 per ton; but, in consequence of the falling off in the American fishery, £2000 per ton is now being asked for size-bone, with every chance of being realized. At a rough estimate the value of the produce would probably be about £24,680.

I mentioned earlier in these notes the 'Problem,' formerly of Yarmouth. Three of the trawlers, which formed part of the "Short Blue" fleet of Messrs. Hewitt & Co., of that port, and which has now been dispersed, were purchased for service in the Arctic; they were sailing vessels, averaging about 136 tons d. w., very handy, good sea-boats, and splendid sailors; but the venture has been most unfortunate. Of the three, the 'Problem,'

which was to have met the 'Active' at Southampton Island,* founded in the Atlantic; but happily the crew were rescued. The 'Forget-me-Not,' a stout little craft of 86 tons, fitted out for a private trading expedition to Frobisher Bay, has, sad to say, never been heard of since she left Southampton, where she went to take in her bonded stores. The 'Queen Bess,' after many disappointments and delays, and in spite of gales and heavy seas, reached her destination in safety, and went into winter quarters in Cumberland Gulf in charge of two of her crew, Capt. Young and the other members of the expedition returning to Dundee on board the 'Active.' These small vessels are useful at the stations, to enable the men to extend their cruises much farther than they could do in ordinary whale-boats, as well as to carry cargo from place to place.

I have no exact information as to the catch of Seals by the Norwegian vessels in the Greenland Seas, but Mr. Kinnes tells me that it was very small, and that the Bottle-nose fishery was considerably less than in the previous season.

The 'Laura,' which left Tromsö in July last for East Greenland, principally to catch Musk Oxen, reports that in this respect her voyage was a failure. Happily for the preservation of these interesting animals, the ice seems to be again forming a barrier off the shore; but, in addition to the disgraceful destruction of these animals in recent years by the vessels which have been able to land there, Dr. Nathrost states† that already a modification of the fauna seems to have resulted by the arrival upon the scene of the Arctic Wolf, the migration of which he traces round the north and east of Greenland to Scoresby's Sound, where he is of opinion it made its appearance subsequent to 1892. The effect of this arrival is most apparent in the diminution in the numbers of the Reindeer, and, in a less degree, of the Musk Ox, which also Dr. Nathrost regards as a comparatively recent arrival on the east coast.

I have, as on former occasions, to express my thanks to Mr. Robert Kinnes, of Dundee, and to Mr. Michael Thorburn, of St. John's, Newfoundland, for their kind assistance.

* It is quite possible that the mineral wealth of that island may prove a greater source of profit than even the fishery.

† 'La Géographie,' quoted in Geogr. Journ. 1901, p. 310.

SOME ACCOUNT OF THE GROUND HORNBILL,
OR BROM-VOGEL (*BUCORAX CAFER*).

By W. L. SCLATER, M.A., F.Z.S.

THIS interesting bird belongs to a genus confined to Africa, and containing only two species—one found in West and North-east Africa, distinguished by possessing a conspicuous and



abruptly truncate casque on the bill at the base; the other, our present bird, which has no casque, as can be well seen by the figure here given.

The Brom-vogel is found in the eastern half of Cape Colony, especially in the partially wooded and thorn country below the mountain ranges in Natal, in the low country of the Transvaal and Rhodesia, and along the Zambesi Valley as far as Northern Damaraland and Angola, and northwards throughout Nyasaland and German East Africa. It is generally known as the "Turkey Buzzard," or "Wild Turkey," among the English colonists; the "Brom-vogel" among the Dutch; and the "Intsingizi" among the Kafirs and Zulus.

Its appearance is sufficiently remarkable. Its plumage is black throughout, except the primary feathers of the wings, which are white, but which are not seen, as a rule, when the bird is at rest or walking. The naked skin round the eyes and the wattle on the throat are a vermillion-red, and this no doubt has gained for it its familiar name of "Wild Turkey."

These curious birds move about the country in small troops of from six to eight individuals; they feed entirely on the ground, and are more generally seen in the open, though sometimes to be found in the bush. Unlike other Hornbills, they walk, and do not hop, and, when pressed at all, can run at a very good pace. Occasionally, when flushed, they take to flight, but seldom for farther than half a mile or so, when they generally take refuge in cover, sometimes perching on the branch of a tree. At night also they roost in trees. A favourite resort is a patch of burnt ground; there, with their long beaks, they turn up the sods in search of insects or grubs. Having found a dainty morsel, they take it between the tips of their mandibles, and toss it up in the air, catching it again, and swallowing it immediately. They also kill and eat Snakes, Frogs, Lizards, Tortoises, Rats, and Mice. I have not seen them kill a snake in the dramatic fashion described by Mr. Ayres, but at all times, when they have secured a choice morsel, they will stretch out their wings, jump up in the air, and give vent to their "bromming" sound. Mr. Ayres' oft-quoted account is as follows:—"On discovering a snake, three or four of the birds will advance sideways towards it, with their wings stretched out, and, with their quills, flap at and irritate the snake till he seizes them by their wing-feathers, when they immediately all close round, and give him violent pecks with their long and sharp bills, quickly withdrawing again when the snake

leaves its hold. This they repeat till the snake is dead. If the reptile advances on them, they place both wings in front of them, completely covering their heads and most vulnerable parts." When the snake is dead they proceed to bite it between their two mandibles throughout its whole length, probably dislocating the snake's backbone. It is then swallowed head first, and, if the snake is a large one, the bird will go about with half of it trailing out from between its jaws. Tortoises, too, are much relished. In this case all the flesh, including the head and limbs, are neatly picked away from the unhappy reptile, leaving the shell clean and entire without damage.

The call is a kind of "boom boom," constantly repeated until it becomes quite wearisome. Mr. Ayres states that it can be heard at a great distance, under favourable circumstances as far as two miles. My experience—which, however, is confined to a bird in captivity—does not quite confirm this; but the sound, though by no means loud, has a remarkable penetrating power. The call of the female is similar, but is pitched a tone above that of the male, and is usually heard in answer to him. When "booming" the red pouch under the throat is generally, though not invariably, distended with air; this action can be performed at will. Mr. Layard lays great stress on the evil stench emitted by this bird, but I have not found this at all noticeable in the case of the individual observed by myself.

A complete account of the nesting habits of the Brom-vogel has not, so far as I am aware, been yet given, but it doubtless builds a nest on the flat crown of a tree where the trunk has decayed away, or else in a hole in a tree. Dr. Stark visited a nest at Boschfontein, near Balgowan, in Natal; it was in a hole some forty feet up in the trunk of a large tree growing in a small piece of thick bush. The birds were stated to nest annually in the same place, and Mr. Hutchinson, who showed him the nest, believed that several females laid in the same hole, as more than one pair of birds visited the young ones. The Brothers Woodward also found a nest built of sticks in a large tree standing by itself on the high flat lands over the Ifafa River, in Natal; in it were two young birds, one much larger than the other.

An egg, now in the South African Museum, taken by Colonel Bowker, at Old Morley, a mission station in Tembuland, is a

somewhat elongated oval, tapering to a point ; the shell is rather rough and thick ; the colour was originally white, but is stained and dirty. The egg measures 2·95 × 1·80 in.

Almost everywhere the natives of South Africa attach magical properties to this bird, chiefly connected with the production of rain. The Kafirs of the eastern portion of the Colony, during times of severe drought, will kill one by order of the "rain doctor." A stone is then attached to its neck, and it is flung into a "vlei," or sometimes into a river. The idea is that the bird, having an offensive smell, will make the water sick, and that, in order to remedy this state of things, rain will fall in great quantities, which will flush out the "vlei" or river. The Ovampos of North Damaraland also have a superstition. When Mr. Andersson asked one of their chiefs to obtain the eggs of this bird for him, he replied that it could not be done, as they were soft to the touch, and would fall to pieces on the least handling.

In captivity this bird makes a charming and delightful companion ; it is very sociable, and loves to come and squat close to one to be petted. It is most useful in the garden, as it spends a great deal of its time searching for caterpillars, snails, worms, and grubs of all kinds ; should, however, any young chickens or ducks be about, it is well to keep the bird under restraint, as these are delicacies which even the best regulated "Brom" cannot resist.

When resting, the whole length of the tarsus is applied to the ground, and the head is almost withdrawn between the capacious wings, so that only the beak protrudes. It is always hungry, and will eat almost anything from bread and butter to the entrails of fish and poultry. Anything thrown to it is caught in the air with great dexterity between the tips of the bill, and is then tossed up and swallowed ; but, when a specially dainty morsel is offered, it will bring it in its beak, with wings uplifted and wattle puffed out, and show it to its master with much "bromming."

I am indebted to the kindness of Miss A. Treggold for the accompanying photograph, which is by far the most successful of a great many attempts made by my friends to portray this very interesting pet.

THE ROSEATE TERN ON THE FARNE ISLANDS.

BY THE REV. F. L. BLATHWAYT.

THE Roseate Tern (*Sterna dougalli*) was discovered in July, 1812, on some small islands in the Firth of Clyde, by Dr. McDougall. The species was probably first observed on the Farne Islands not long after this date. Selby, in an article on the Birds of the Farne Islands ('The Zoological Journal,' vol. ii.), stated that the birds were first noticed there about the year 1811 as a new species. The date is apparently not quite correct, but it tends to show that the species was noticed on the Farne Islands very soon after it was discovered in Scotland. In the same article Selby continued :—"They now (1825) having greatly increased, form a numerous colony, which occupies a large space of ground near to that occupied by the Arctic species, and a second station upon one of the Wamseys." From this time they appear to have steadily decreased in numbers on the islands, though it is just as likely that they were driven away by the stronger species as that they were shot down and robbed by visitors.

Hewitson, in his 'British Oology,' edit. i. wrote concerning the Roseate Tern :—"Upon the Farne and Coquet Islands . . . they are very limited in number, consisting of a few pairs only, mixed and associating with the numerous flocks of Arctic and Sandwich Terns."

The species still inhabited the islands in 1856, for in the 'Proceedings' of the Berwick Naturalists' Club for that year a contributor, who had visited the islands, wrote, referring to Brownsman Island :—"The sea-fowl are here very numerous, especially . . . the Sea-swallow or Common Tern; the Sandwich Tern and the Roseate Tern are less abundant." After this the islands seem to have been nearly abandoned by this species, though it is probable that a few pairs nested on them every year. Gould, in his 'Birds of Great Britain' (1862-73), stated that he

thought a few pairs still bred on the Farnes, and that eggs had been obtained there within the last five years.

In the year 1880 several pairs arrived in May, and they would probably have again established a colony had not many of them been most unfortunately shot. For the next seven years they were very scarce, but had evidently not quite deserted the islands, as in most of the numerous articles in natural history periodicals, describing visits to the islands during these years, the writers state that they have either seen one or two specimens, or have heard from the fishermen that a pair or two might always be noticed during the nesting season. The favourite islands seem to have been the Wideopens and the Knoxes.

In 1888 an association was formed for the purpose of protecting the sea-birds and their eggs on the Farne Islands, and during the breeding season watchers were placed on some of the islands to prevent visitors from molesting the birds. Reports were also issued showing the increase or decrease of the various species, and so from this time it is comparatively easy to trace the history of the Roseate Terns. In spite, however, of the efficient protection, these birds, unlike the other sea-fowl, did not increase in numbers. In nearly every report of the Society for the next ten years it is stated that two pairs only were seen on the islands, and surprise was expressed that their numbers did not increase. In 1898 it was hoped that this happy result might be attained, for five or six pairs of birds appeared in the spring of that year. In the next year, however, only two pairs were reported, and in 1900 it was thought that only one pair inhabited the islands.

When the large increase of the Eider Duck and Sandwich Tern upon the islands during late years is considered, it is somewhat disappointing to find that the Roseate Tern is only just able to hold its own. The latter, however, does not appear to be a very sociable species, and is liable to be persecuted by its larger congeners;* and among the thousands of sea-fowl which haunt the Farnes there can scarcely be many quiet spots where the Roseate Terns could establish a colony without coming into contact with other birds.

* I state this on the authority of a remark in Mr. Howard Saunders's 'Manual of British Birds,' edit. ii. p. 645. For an opposite opinion, however, of the habits of this species, cf. 'The Zoologist,' 1899, p. 83.—F. L. B.

STATISTICS RELATING TO BRITISH BIRDS.

BY THE REV. A. R. HORWOOD.

WHEN we are told that the number of birds on the British list amounts to 415 species, most of us are at first inclined to treat this statement *cum grano salis*, as though it were a fabrication. On further consideration, however, we shall see that after all this is quite possible—that is to say, if we assume that the 415 birds are not all with us at the same time.

Allowing, then, that there are two well-defined seasons in the year—summer and winter—and also that there are two primary classes of birds on the list—resident and migratory—we see our difficulties somewhat disappear. Observing further that the latter of these two classes may be subdivided into two further classes—summer and winter migrants—we then see that it is comparatively easy to account for the apparently large number of so-called British Birds. This last phrase is used advisedly, for it must be patent to all that some of our British Birds have very little title to the name.

And thus we find there is a fourth class, beside the resident, the summer, and winter migrants, namely, the accidental or occasional straggler to our islands. Owing to many causes—such as migration, gales, and probably, to a greater extent than is generally imagined, to the escape of rare captive birds—our list of accidental visitors is a long one.

To this last class might be added a fifth—the extinct class; but as only one species that has lived within the memory of man in England has so disappeared, we may, I think, omit this class; for it only includes the now world-famous Great Auk, which became extinct about two hundred years ago.

Having reduced our list of birds to four—or, if preferred, five—great classes as regards occurrence, and using the same terms for their degree of frequency, we may, without going into too close details, examine the matter more carefully with respect to families and genera.

In our examination we will, for sake of uniformity, invariably follow the order of classification and nomenclature of Seeböhm.*

* 'Coloured Figures of the Eggs of British Birds.'

We give below a classified table to illustrate our meaning more clearly :—

Family.	Name.	Total No. of Species.	Species, Resident.	Species, Regular Summer Migrants.	Spring and Autumn (Winter) Migrants, Regular.	Occasional and Accidental Visitors.	Extinct.	Remarks.
1	Falconidae (Vultures, Eagles, Falcons, Hawks)	31	11	3	—	17	—	1 introduced.
2	Sirnidae (Owls)	11	4	—	—	6	—	—
3	Anatidae (Swans, Geese, Ducks)	44	14	—	14	16	—	[sident.]
4	Phoenicopteridae (Flamingoes)	1	—	—	—	1	—	2 used to be re-
5	Ardeidae (Hercos, Storks)	14	1	—	—	13	—	—
6	Pelecanidae (Pelicans)	4	3	—	—	1	—	—
7	Procellariidae (Petrels)	11	4	—	—	7	—	—
8	Colymbidae (Divers)	4	3	—	—	1	—	—
9	Podicipitidae (Grebes)	5	2	—	—	3	—	—
10	Rallidae (Rails)	7	3	—	3	1	—	—
11	Otididae (Bustards)	4	—	—	1	—	3	—
12	Alcidae (Auks)	7	4	—	—	2	—	1 used to be re-
13	Laridae (Gulls, Skuas, Terns)	32	11	—	1	2	18	—
14	Charadriidae (Plovers)	56	12	4	—	17	23	1 used to breed.
15	Gruidae (Cranes)	3	—	—	—	—	—	—
16	Columbidae (Pigeons)	6	3	—	1	—	2	—
17	Pteroclidae (Sand-Grouse)	1	—	—	1	—	1	—
18	Cypselidae (Swifts)	3	—	—	1	—	2	—
19	Caprimulgidae (Nightjars)	3	—	—	1	—	2	—
20	Meropidae (Bee-eaters)	2	—	—	—	—	2	—
21	Coraciidae (Rollers)	3	—	—	—	—	3	—
22	Upupidae (Hoopoes)	1	—	—	1	—	—	1
23	Alcedinidae (Kingfishers)	2	1	—	—	—	—	—
24	Picidae (Woodpeckers)	7	3	—	1	—	3	—
25	Cuculidae (Cuckoos)	4	—	—	1	—	3	—
26	Passeridae (Singing Birds)	140	50	—	50	—	40	—
27	Tetraonidae (Grouse)	4	4	—	—	—	—	1
28	Phasianidae (Pheasants, Partridges)	4	—	—	—	—	—	—
29	Turnicidae (Hemipodes)	1	—	—	—	—	—	—
		Total.	415	187	68	39	169	1
								1

Taking the families in the table first, we see that there are twenty-nine families, with an aggregate of 415 species. For a small area like the British Islands, this is a very large percentage, at first sight, of the total known species in the world, which number about 12,500.

Looking now at the total number of species in each family, we see that the *Passeridæ* hold the first rank, numbering 140, or one-third of the whole number. As our finest songsters are found in this family, we must look on this with great satisfaction.

The next in order of number are the *Charadriidæ* (56), then come the *Anatidæ* (44), followed by the Gulls and Terns, or *Laridæ* (32), lastly, the Vultures and Eagles (31).

That the largest number of species includes the smallest birds, and that the largest birds are in the minority, is only natural, considering the small area and populous state of the country. Here it may be added that the largest British bird is the Mute Swan, measuring 5 ft.; and the smallest bird is the Golden-crested Wren, measuring $3\frac{1}{2}$ in. from tail to beak.

Of resident species, we can now boast 187 species. Several species—such as the Kite, Bittern, Bustard, Crane, and others—used to be resident, whereas they are now only accidental visitors. Of these only five families run into double figures, the *Passeridæ* being again predominant; whilst next in order are the *Anatidæ*; then come the *Charadriidæ*, the *Laridæ*, and then the *Falconidæ*.

The total number of resident birds, it will thus be seen, is about one-third of the total number on the list.

Taking next in consideration the summer migrants, which come to us in April and leave us at the latest in October, we find the number that visit us is sixty-eight. Of these fifty are *Passeridæ*, and none of the rest run into double figures; whilst many of these latter only visit us occasionally, and many of the *Passeridæ* are resident in certain localities.

This makes our total breeding birds to number 205. Really only about 187 can be said to breed with us regularly, and some of these only locally. This number, it will be noticed, hardly amounts to half the total number.

Owing to the fact that many of our winter migrants only frequent out-of-the-way spots, we can only record thirty-nine

regular species. These belong mostly to the *Anatidæ* and *Charadriidæ*.

Next in order is the fourth class—the accidental and occasional visitors. These amount to 169, but owing to the difficulties of observation many of them may undoubtedly be classed as regular spring, autumn, or winter migrants.

In the same way the numbers of the other classes must be modified according to locality, period, and observation.

Of the fifth class, only one species—the Great Auk—is exemplary. One species—the Little Owl—may also be classed as a *lately introduced* bird, like the Red-legged Partridge of an earlier date.

Thus, then, we see how it is possible for the birds on the British list to amount to 415 species, since considerably over one-third are accidental visitors, and barely half of them remain to breed with us. After all, when we consider the fact in all its bearings, it is not so very surprising if we look at it from a world-wide point of view. Our islands are situated in the temperate regions, where birds that live in the warmer regions migrate to breed. We get, then, birds from the semi-tropical regions, and birds on their way to and from the far north from our own region. In a similar way we are situated only a few miles, in the south, from the Continent. This in itself explains why our own avifauna is largely supplemented in the summer by visitors from all parts. Indeed, when we come to think of it, we must wonder why many species abundant on the Continent are not met with at all in our own country. We find birds, such as the Stork, breeding in Holland, which from its nature might just as well breed in England.

Lastly, it is not surprising that we receive visits from American species, when we consider the long distances travelled by our summer migrants, and the fact that it is only a five days' trip in the liners of the Atlantic to the New World. How comparatively short a distance must it seem, then, to such an untiring creature on the wing as the bird!

NOTES ON BIRDS MADE DURING THREE SHORT VISITS TO THE BEACH AT DUNGENESS.

By THOMAS HEPBURN.

THESE observations were made on May 10th-14th, June 3rd-4th, and July 16th-21st (1900).

MISTLE-THRUSH (*Turdus viscivorus*).—May 10th. Found a nest in one of the clumps of elder and holly bushes, which are a feature of this stretch of beach. The nest was in the fork of an elder-bush not more than three feet above the ground. The outside of the nest was made almost entirely of sheep's wool, with a few sticks entangled in it, and was neatly lined with fine grass. It contained four young birds about a week old. July 16th-21st. Noticed considerable numbers of these birds on the grass-lands and meadows which join the beach. They seemed to be mostly young birds.

SONG-THRUSH (*T. musicus*), BLACKBIRD (*T. merula*).—These birds were also nesting in the patches of bush on the beach.

WHEATEAR (*Saxicola œnanthe*).—May 10th-14th. Nesting everywhere. Found two nests in crevices of the military earthworks, one in an empty shell-case, and another in an empty tin can. The eggs in one of the nests were fresh, in the others hard sat. June 3rd-4th. Found a nest with three fresh eggs in a crack in a bank of earth. July 16th-21st. Old and young birds all over the beach and adjacent meadows.

REED-WARBLER (*Acrocephalus streperus*).—July 16th-21st. Found three nests in the reeds fringing a pool of water on the marsh-land; one containing three perfectly fresh eggs, another with three young birds and an addled egg, and a third from which the birds had evidently just flown. The birds were singing all round in the reed-bed.

SEDGE-WARBLER (*A. phragmitis*).—Common everywhere amongst the growth on the edges of pools and dykes.

PIED WAGTAIL (*Motacilla lugubris*).—Common near the fishermen's or coastguards' cottages and farm-buildings. Rather a favourite nesting-place for them was amongst the stacks of fish-boxes near the coast.

YELLOW WAGTAIL (*M. raii*).—A common bird on the marsh-land.

May 10th. Found a nest in an empty iron shell-case with a full clutch of fresh eggs in it. July 16th-21st. Plenty of these birds still about.

MEADOW-PIPIT (*Anthus pratensis*).—About the commonest bird on the beach and surrounding land, laying wherever there is a “tot” of grass big enough for it to make its nest in. May 10th-14th. Found nests with eggs in all stages of incubation, and with young birds already fairly well-fledged.

SWALLOW (*Hirundo rustica*).—May 10th-14th. A good many of these birds building in the recesses of the sham forts on the artillery range. July 20th. Found a nest under the eaves of a shed on the marsh-land with five fresh eggs in it.

GREENFINCH (*Ligurinus chloris*).—May 10th-14th. Nesting in numbers in the holly and furze bushes on the beach.

HOUSE-SPARROW (*Passer domesticus*).—May 10th-14th. Numbers of nests in the tops of the holly and elder bushes on the beach, at quite a considerable distance from any farm or building.

LINNET (*Linota cannabina*).—May 10th-14th. Nesting in the holly bushes on the beach. I also found a good many nests in the tussocks of coarse grass growing on some sand dunes in the direction of Rye; some of these latter nests were made right on the level of the ground.

CORN-BUNTING (*Emberiza miliaria*).—A clutch of addled eggs of this species were sent on to me (Aug. 14th). I was told that they were common on the arable land of the marsh, but I did not see any myself.

YELLOW BUNTING (*E. citrinella*).—May 10th-14th. Common and nesting in the furze bushes.

REED-BUNTING (*E. schaniclus*).—May 10th-14th. Nesting in some numbers in any places near water. Some of the nests I found at this date contained hard-sat eggs, and all of them showed signs of incubation. The nests were, as a rule, within twelve inches of the ground, in rank grass or rushes; two of them were right on the ground. The nests are rather loosely constructed of grass, with a slight lining of hair.

STARLING (*Sturnus vulgaris*).—May 10th-14th. Considerable numbers feeding in the meadows; also nesting in holes in the thatch of all farm-buildings.

ROOK (*Corvus frugilegus*).—May 10th-14th. There is a rookery in Lydd, and there are always numbers of these birds feeding on the marsh-land and meadows.

SKY-LARK (*Alauda arvensis*).—May 10th-14th. Nesting everywhere

in great numbers, even right out on the open beach. July 20th. Found a nest with two eggs in it, and was told of one being found the previous week containing eight eggs.

NIGHTJAR (*Caprimulgus europaeus*).—May 14th. Disturbed one from under the shelter of a stack of brushwood close under the sea-wall. It flew a short distance, and then settled in the grass. When I flushed it a second time it flew away out of sight.

COMMON HERON (*Ardea cinerea*).—There are nearly always some of these birds feeding along the sands at low tide.

WILD DUCK (*Anas boscas*).—Breeds in numbers along the dykes and sewers, and also out on the beach among the stunted sloe and broom bushes. July 16th-21st. Considerable numbers of young birds on some of the inland patches of water.

RING-DOVE (*Columba palumbus*).—Often a few Wood-Pigeons feeding out on the patches of grass-land scattered about the beach.

STOCK-DOVE (*C. ænas*).—Always a few of these birds about the beach feeding on the green places. May 14th. I noticed one of these birds fly up from a rabbit's burrow. Upon investigating I found its rough nest and two young birds down the burrow.

PARTIDGE (*Perdix cinerea*).—A good many about on the beach.

RED-LEGGED PARTRIDGE (*Caccabis rufa*).—May 13th. Found a nest of this species built on the bank of one of the big sewers which drain the marsh-land. Also saw several of the birds out on the beach.

MOOR-HEN (*Gallinula chloropus*).—Moor-hens' nests are very numerous in the dykes and pools of water on the marsh-land. In no cases were the eggs in any of the nests that I found covered over with leaves.

COOT (*Fulica atra*).—May 13th. Found two nests in the reeds surrounding a pool of water on the marsh; two eggs in one, and eight eggs in the other. In both instances the eggs were quite fresh.

STONE CURLEW (*Ædicnemus scolopax*).—Local name, "Night-Hawk." Several pairs of these birds still breed on the beach, but they are by no means common, and all the coastguards' and fishermen's sons know that the two eggs have a marketable value. May 14th. I saw one of the birds fly up from the beach, and, on looking along the ridge from about which it flew, I found its two eggs lying on the shingle. The apology of a nest in which they lay was simply a hollow scratched out in the shingle, measuring about 7 in. in diameter and $\frac{3}{4}$ in. deep. The two eggs were laid fully two inches apart, and end to end. I was told by a fisherman that they are never laid close together. Surrounding the hollow were several pieces of broom, which had the appearance of having been put there by the bird. One egg was rather larger than

the other, and the same fisherman as I have mentioned above said that they always call the larger egg a cock's egg, meaning that a male bird would be hatched out of it. The same day another pair of these eggs was offered to me for sale, and I was informed of a further pair having been found two days previously. This shows that there are several pairs breeding on the beach, and also that they must find it a difficult matter to bring their business to a satisfactory conclusion.

DOTTEREL (*Eudromias morinellus*).—Local name, "Land Dotterel." May 10th–14th. Saw several pairs of these birds on this visit, but saw none in June or July.

RINGED PLOVER (*Ægialitis hiaticula*).—Local name, "Stone Runner." May 10th–14th. This is a common bird on the beach, and nests there in considerable numbers. Owing to the close similarity in the colouring of the eggs and the shingle, and to the artful behaviour of the old birds, its eggs are far from easy to find. I was shown a nest on May 12th with four eggs in it. The nest was a neat hollow made in a patch of rather small shingle, and measured $3\frac{1}{2}$ in. diameter and 1 in. deep. It was just big enough to take the four eggs, with the small ends all accurately pointed to the centre, and slightly depressed. July 16th–21st. Was told of a nest with three eggs in it having been found a week previously. The birds were just as numerous on the beach as during May. One could not walk far without one's attention being called to it by its plaintive whistle, as it flew round in wide circles. Large numbers were to be often seen feeding on the grass-land, especially towards evening.

KENTISH PLOVER (*Æ. cantiana*).—May 10th–14th. I was introduced to this small and somewhat rare little Plover by one of my fishermen friends, who showed a very considerable knowledge of its breeding habits. He informed me that he knew of at least four pairs breeding on different parts of the beach, and that each of these pairs would, if it had the chance, lay two clutches of eggs. After watching one pair of the birds through our glasses, he said, from their behaviour, he should judge that they had not started laying yet; and he took me off to another part of the beach, where he very soon showed me a nest with three eggs in it. I found the eggs most difficult to distinguish, even when close to the nest. The hollow in the shingle in which they were laid was 3 in. in diameter and $\frac{3}{4}$ in. deep. The pebbles on the inside of the nest had a rather worn and stained appearance from the bird sitting on the eggs.

LAPWING (*Vanellus vulgaris*).—May 10th–14th. There were great numbers of these birds on the beach and adjoining marsh-land. Many of them breed right out on the shingle; in fact, they lay their eggs

anywhere, either on the grass-land or the shingle. There is a considerable traffic in their eggs during the early months of the spring. In all of the nests that I found there were clutches of only three eggs, and, as they were also all hard-sat, this was the full clutch laid in these particular cases. When the nest is made on the shingle there is generally some attempt at lining it with grass, although in one case the eggs were laid right on the stones. July 16th-21st. At this date there was not a single Lapwing to be seen on the beach proper. There were, however, large numbers of them, old and young birds, on the marsh and meadow lands; but they seemed to have quite deserted the shingle.

COMMON SNIPE (*Gallinago cœlestis*).—May 13th. I disturbed a single bird of this species by the side of a ditch. My companion told me, however, that he had never heard of a nest being found in the district.

DUNLIN (*Tringa alpina*).—May 10th-14th. Small flocks of this bird are numerous in suitable places on the beach. I caught one that had at some time or other lost one of its wings. I was told that there are often maimed birds like this feeding with flocks of sound ones. This specimen was in perfect plumage and fat condition. It was feeding with a small mob of its fellows, and my attention was called to it by its not taking flight when its companions rose at my approach. July 16th-21st. I did not notice any Dunlin on this occasion.

REDSHANK (*Totanus calidris*).—Local name, “Red-legs.” May 10th-14th. A most conspicuous bird everywhere, on account of its loud whistle and bold behaviour when anyone is near its nest. It is common both on the beach and on the marsh-land. Nests were to be found at this date with both fresh and hard-sat eggs in them. One nest I found was made right on the shingle, with only the scantiest lining of grass and lichen. June 3rd. I found a nest in a patch of grass on the beach with one fresh egg in it. The nest, however, had the appearance of being deserted. July 16th-21st. The Redshanks, like the Lapwings, had quite deserted the beach proper, nor were they numerous anywhere else. I only saw five birds on this occasion, and they were some distance inland, near a piece of water on the marsh.

COMMON CURLEW (*Numenius arquata*).—May 10th-14th. Saw single birds, and also several flocks of this species flying inland from the sea-coast. During my two later visits I saw none of these birds.

WHIMBREL (*N. phœopus*).—May 13th. Picked up a recently shot specimen of this bird by the side of a ditch inland.

COMMON TERN (*Sterna fluviatilis*).—Local name, “Kip.”—May 10th-14th. There were plenty of these birds about the beach and sea-coast at this date, but they had not yet begun to lay. June 3rd-4th. Now nesting

in considerable numbers on various parts of the beach. As a rule the birds were congregated into colonies, but I found two separate nests in quite isolated positions. In the colonies the nests were on an average fifteen or twenty yards apart. The variation in colour and in size of the eggs, even in the same nest, was very great. Their nests—merely a shallow scrape out in the shingle—were in most cases lightly lined with dry grass. In several instances I found eggs indented and cracked, due no doubt to the unevenness of the bottom of the nest causing undue weight on one portion of the egg when the bird is sitting on the nest. At this date I found eggs with the young birds beginning to form, and others quite fresh. July 16th–21st. I did not notice so many of these birds on this visit, but, as I was chiefly on the western edge of the beach, from which the birds had been driven by the artillery practice, that was probably the only reason for my not noticing so many. I was told that the majority of them were to be found to the east of Dungeness Point.

LESSER TERN (*Sterna minuta*).—Local name, “Skerrek.” May 10th–14th. Common about the beach, but not yet started laying. June 3rd–4th. Found them nesting in small companies in a good many places on the beach. They seem to choose places where the shingle is small and comparatively fine, and often do not even trouble to make the usual slight scratch out, laying their eggs in a chance depression, such as a footprint. The nests in these colonies were generally rather closer together than in the case of the Common Tern—say, about eight to ten yards apart. There was no real attempt at lining any of the nests I saw, although they occasionally had an odd blade of grass in them. Several of the eggs I found were showing signs of incubation. There was not quite so much variation in the colour and size as in the eggs of the Common Tern. The complement of eggs in both species seems to be either two or three.

BLACK-HEADED GULL (*Larus ridibundus*).—Local name, “Crock.” May 10th–14th. There is a fair-sized colony of these birds on some pools of water in the middle of the beach. Round the edges of these pools there is a thick growth of reeds and sedges, extending some way from the banks. Most of the nests were resting on the flattened tops of these reeds, which formed a fairly substantial support. The nests themselves were careless structures, the outer part made of dead reeds, with an occasional lining of dry grass, but quite as often without any fine lining at all. All these nests were built on the side of the rushes farthest from the land, and were on this account difficult to get at, as the water at the edge is covered by a treacherous layer of dead vegetation. This is not safe to trust one’s weight on, for if

breaking through one is immediately in very deep water. Masses of this dead vegetation had broken away from the edges, and were floating about the surfaces of the water, and on nearly all of them one could, with the glasses, distinguish eggs lying right on the surface of the débris, without any attempt at nests. I only saw two clutches with three eggs, the rest of the nests I could see having only one egg in them. July 16th-21st. I only saw old birds on the part of the beach that I visited.

HERRING-GULL (*L. argentatus*), LESSER BLACK-BACKED GULL (*L. fuscus*), GREAT BLACK-BACKED GULL (*L. marinus*).—There were numbers of these three species on the beach in both mature and immature plumage. They seemed to make a special haunt of the pools where the Black-headed Gulls breed.

GUILLEMOT (*Uria troile*).—I picked up a dried specimen of this bird amongst the débris on the beach.

LITTLE GREBE (*Podiceps fluvialis*).—May 10th-14th. Breeding in considerable numbers in the ditches and pieces of water on the marsh-land. I found nests with fresh eggs and eggs just hatching out on May 13th.

NOTES AND QUERIES.

MAMMALIA.

The Food of the Water-Vole.—There has been, I believe, much discussion as to whether the Water-Vole (*Arvicola amphibius*) will eat animal food or not. Most writers on natural history agree to their being entirely vegetable feeders. The Rev. J. G. Wood, among others, says:—"I never yet saw the true snub-nosed, short-eared, yellow-toothed Vole engaged in eating animal food, although the Brown Rat may often be detected in such an act." I myself have twice caught the Water-Vole in the ordinary steel rat-trap baited with meat, which I think proves that the Water-Vole will at times partake of animal food if it can get it.—GORDON DALGLIESH (Inglefield, Milford, near Godalming, Surrey).

AVES.

Breeding of the Lesser Redpoll (*Linota rufescens*) in Somerset.—It is only during recent years that the Lesser Redpoll has been recorded as a species which breeds in Somerset. Of late, however, several nests of this bird have been found, and it is probable that at the present time the species breeds regularly in many parts of the county. I am not aware that any nest has been recorded as found in the county before the year 1888, but in that year the Rev. T. W. Allen informs me that he found a nest on the Blackdown Hills, near Wellington, and that he knew that two more nests had been found more recently in the same district. This species has also bred in the neighbourhood of Frome, for the Rev. M. A. Mathew has recorded (Zool. 1897, p. 423) that nests and eggs have been taken, and a brood of young birds seen, near Buckland Dinham Vicarage, between the years 1888 and 1897. Mr. C. F. Henderson, of Flax Bourton, near Bristol, has informed me in writing that the Lesser Redpoll has nested frequently in his neighbourhood since the year 1892. In one season he knew of four nests within a small area. In the pages of 'The Zoologist' for 1894 are several notices of the breeding of the Lesser Redpoll in Somerset (*vide* pp. 228, 265, 304, 305). From these records it appears that observers noticed that the species nested in several localities near Bath in 1893,

and near Clifton and Bridgwater in 1894. During the last four years I have occasionally seen Lesser Redpolls at the end of April in the woods on Worlebury Camp, Weston-super-Mare, some of the birds displaying the rosy breeding plumage on their breasts. I cannot be sure that the birds have ever nested in these woods, though I think it very probable that they may occasionally have done so. This species also nests in the interesting country near Ashcott and Shapwick, known as the turf or peat moors. In this district the birds find just what is suited to their requirements, as the beds of alder and sallow afford them both food in the winter and nesting accommodation in the summer. Little flocks are seen in this district during the winter months, feeding on the seeds of the alder, and I am told by competent authorities that a good many nests have been discovered in the summer. A working man of the district, with whom I was conversing on the subject, seemed to know the species well, and described to me the little nests which he had often found, beautifully lined with vegetable down. On June 12th of last year I visited the turf-moors, and saw several Redpolls flying about among the alder plantations near Ashcott Station, and uttering their harsh and wheezing notes. Several pairs appeared to be breeding, but I could only discover one nest, which was placed near the top of a sallow-bush, and contained a single egg. It is, I think, fair to conclude from these notes that the Lesser Redpoll is at the present time a fairly regular resident in Somerset, and possibly far more so than is generally supposed. The above records prove that the species has bred in the northern parts of the county, and also on the central levels, and near the south-western boundary. It would be interesting if other observers could still increase our knowledge of the breeding range of the bird in the county. As the records of its breeding in the county do not appear to extend back more than about fourteen years, it seems probable that it has only lately established itself as a nesting species, though how far this supposition is due to increased observation it is impossible to say.—F. L. BLATHWAYT (Lincoln).

Green Woodpecker boring in Winter.—In 'The Zoologist' for 1897 (p. 573), I recorded an instance of the Green Woodpecker (*Gecinus viridis*) boring in November. A similar instance has just occurred here, a beech tree having been recently bored by the same species, possibly the same bird. The enclosed fresh chips, which I picked up under the tree to-day (Jan. 14th) show plainly that the Woodpecker is at work on an ordinary nesting-hole. — JULIAN G. TUCK (Tostock Rectory, Bury St. Edmunds, Suffolk).

[Fresh chips duly received.—ED.]

Curious Accident to a Kingfisher.—The following ornithological incident may be worthy of record in these pages :—In a letter from Mr. Ernest White, of Wear House, in this city, he states :—“ I was walking yesterday (Jan. 5th) by the river near Bow Corner, when I observed a Kingfisher (*Alcedo ispida*) fastened to a tree about twelve feet from the ground. By carefully bending the branch downwards I was able to release it. It was held by the gummy secretion of a chestnut-bud, which adhered very tightly to the breast-feathers. It had sustained no injury whatever. Having satisfied myself on this point, I placed the bird on the back of my hand, where it sat for three or four minutes before flying away.” I have never before heard of such an instance of nature using birdlime to entrap a Kingfisher. I may add that there had been several bright sunny days, and that I found the chesnut-buds exuding their gum freely.—H. B. TRISTRAM (Durham).

Tengmalm's Owl in Northamptonshire.—A good example of Tengmalm's Owl (*Nyctala tengmalmi*) was shot on Jan. 8th at Apthorpe, in Northamptonshire, and, being sent by Sir J. Crossley to Norwich for preservation, I had an opportunity of examining it in the flesh at Mr. Roberts's shop, where we endeavoured to see the asymmetry of the ears, which, though strongly marked in this species, is very difficult to detect in the exterior “ conch.” Tengmalm's Owl is a species not included in Lord Lilford's ‘ Birds of Northamptonshire,’ to which county, I presume, it is an addition. — J. H. GURNEY (Keswick, Norwich).

Shoveler in Herts.—Your correspondent, in stating that *Spatula clypeata* had not previously been recorded from Herts (*ante*, p. 27), has overlooked some earlier chronicles. The late Mr. J. E. Littleboy, in his ‘ Notes on Birds observed in Hertfordshire,’ records one killed at Wheathampstead in August, 1882; and the report for 1887 states that there were from three to five Shovelers' nests every year at Tring Reservoirs. Since Mr. Littleboy's death in 1888, I have not received the Hertfordshire ornithological reports. — O. V. APLIN (Bloxham, Oxon).

Red Grouse in Surrey.—In reply to Mr. le Marchant's enquiry upon the subject of attempted naturalization of this species in Surrey (*ante*, p. 27), I may perhaps inform him that, although the actual date of the Duke of Gloucester's essay was 1829, I do not know the year in which Colonel Challoner's introduction took place; nor have I been able to find out any particulars beyond those appearing in the ‘ Field’ in 1871. The discussion which took place at that date was started by

a gentleman signing himself "33," who asked whether Bagshot Heath ever held naturally occurring or imported Red Grouse ('Field,' Jan. 14th, 1871, p. 27). The query was answered by two letters, the first from a contributor signing himself "C. W. D." He says:—"I can tell your correspondent '33' that the attempt has been more than once unsuccessfully made to naturalize the red grouse both on the Surrey Hills and on Dartmoor. I cannot recollect many of the particulars, but within my memory a gentleman (I think, Col. Challoner) obtained a number of grouse, and turned them out on Chobham Common. They bred, and many strayed, and were killed on neighbouring heaths, but they disappeared after two or three years." . . . The rest of this gentleman's letter is immaterial. This note appeared in the 'Field,' Jan. 21st, 1871, p. 38. Another correspondent on the same date, signing himself "Effessea," says:—"An old tenant of mine, the late Thos. Marter, of Durnford, Chertsey, told me that either the Duke of York, when at Oatlands, or the Duke of Gloucester at Bagshot Park, many years ago turned out the red grouse on Bagshot, Chobham, and Frimley Heaths, but they did no good." . . . The rest of the letter is immaterial. Both these accounts are somewhat vague, though I have always thought that in mentioning Chobham as a place where a trial was made the second writer was intending to refer to what was (unknown to him) Col. Challoner's attempt. The Red Grouse was also probably introduced in Surrey prior even to the Duke of Gloucester's attempt in 1829, as Graves, in his 'British Ornithology' (1811-1821) mentions that it "has been turned out in several parts of Surrey, Sussex, and Hants." I have never, however, been able to discover any particulars of such earlier trials, if there really were any. The classic authors refer only to the Duke's essay. A writer in the 'Field,' July 28th, 1860, p. 84, signing himself "Argus," states, in the course of a note on the Game Preservation Acts:—"I have proof of the Bustard and Quail, formerly plentiful on the Surrey and Sussex hills, but none there now; nor would there be a partridge but for the Game Act. Of the grouse turned out by Mr. Bray, of Shere, many were shot by others as *rareæ aves in terrā*; and so supposed without the Game Act." Although I tried, I could never find any evidence that Mr. Bray turned out the Red Grouse, nor for that matter a single definite instance of the occurrence of the Bustard in Surrey; and the context of the letter being vague, and partly, at any rate, quite inaccurate, I did not consider it advisable to make any reference to this letter in my remarks on this species in my 'Birds of Surrey.' Beyond these letters, and the remarks concerning "Red game" made

by Nathaniel Salmon in his 'Antiquities of Surrey,' which I have always regarded as being meant to indicate the Black Grouse, I am not aware of any further notes published upon the importation of this species into Surrey. It may well be that if the actual date of this Col. Challoner's attempt could be ascertained, it may be found that it was considerably later than 1829, and, if so, Mr. le Marchant's informant may be quite correct within a few years. I have heard from another source that it is believed that Mr. Bray did introduce the species near Shere; but, as I have said before, nothing definite.—JOHN A. BUCKNILL (Epsom, Surrey).

Little Bustard in Sussex.—On Dec. 16th, 1901, a specimen of *Otis tetrix* was shot near Burpham, Sussex, and was sent to Mr. W. B. Ellis, taxidermist, Arundel. It was a female, and weighed 26 oz. W. PERCIVAL WESTELL (St. Albans).

[The above is a light weight. The weight of one shot on Drayton Moor, Somersetshire, in 1894, was 2 lb. 2 oz. (*cf.* Harting's 'Handbook of British Birds,' p. 165).—ED.]

On the Feigning of Injury by the Lapwing (*Vanellus vulgaris*) to attract attention from its Young.—Allow me to demur to the interpretation placed on some words of mine, culled from 'The Zoologist' (1897, p. 473), by Mr. Bernard B. Riviere (*ante*, p. 29). If he will turn to pages 27 and 28 of 'The Zoologist' for 1898, the reason for my repudiation of the views ascribed to me will be at once apparent. Meanwhile, I may repeat, for the benefit of those not possessing the back volume in question, that I should never dream of allying myself with such dogmatic reasoning as would deny the possibility and exceptions to almost any rule. Mr. Riviere not only wrongly infers that by the word "devices" I must mean the simulation of injury, but concludes that "we have here two experienced observers expressing their disbelief in the fact that the Lapwing ever employs the ruse of 'shamming wounded' on behalf of its offspring." Nothing of the kind, so far as I personally am concerned; Mr. Selous can answer for himself. Moreover, I would invite attention to two words in the sentence I have quoted; I refer to the words "ever" and "offspring." With regard to the first, who would be so rash, after a prolonged and profound study of Nature, and her frequently inconsistent and contradictory ways, as to deal in uncompromising negatives where she is concerned. I should not. As for the second, I make a vast distinction between eggs in the nest and young birds out of it when dealing with the behaviour of the parent birds. I used the word "nests," implying that eggs in process of incubation were in my mind; your correspondent, as may be seen, writes of the "offspring"

—quite a different story. I have no wish to juggle with words, but when originally employing the term “ devices,” the aerial evolutions and weird, fantastic wheelings of the cock bird—then popularly supposed to be the hen—alone were in my mind. The facts, broadly stated, according to my experience, are these:—While the female is sitting the male keeps guard, and on the approach of an intruder tries to mislead and confuse him—three or four other cocks will occasionally assist—by aerial devices, his mate, meantime, running quickly and silently away from the nest for a considerable distance. When the eggs are hatched, however, very different tactics prevail; both parents are then assiduous in their clamorous endeavours to draw intruders away from where their young are concealed. I may add that some years ago I took the trouble to look up and tabulate what upwards of thirty authors of books on birds had to say on the point at issue, and I found that Selby alone of the entire number had got the true facts correctly. It is unquestionably the rule for the female to run from the nest when danger threatens, but I have known a sitting bird, come upon very suddenly from over a hill and taken quite unawares, to fly direct from her nest; and I have studied the point sufficiently to learn that the female will also fly from the nest at times if she has already been somewhat disturbed, and I have always regarded such action as meaning—Oh! the whereabouts of my nest is known; why should I any longer have recourse to a useless artifice to conceal it?—H. S. DAVENPORT (Melton Mowbray).

Pairing Manœuvres of Birds.—With reference to Mr. Selous' recent remarks on the similarity of the pairing manœuvres of both sexes in certain birds, I should like to draw attention to the Satin Bower-bird (*Ptilorhynchus violaceus*) as a good example of this. I often observed these birds, during my stay in England last summer, at the London Zoological Gardens, and repeatedly noticed that the female uttered the same absurd fizzling song as the male, and used the same gestures. I especially noticed that both sexes frequently jerked up the closed wings, thus, in the case of the hen, showing their yellow lining. Now, if the male of this bird were conspicuously coloured on the under side of the wings, and used this gesture as he does at present, it would be put down as designed for a sexual attraction; and as the female birds are supposed, with much reason, to frequently exhibit a former stage in the colouration of the male, it may be suggested that in this case the colouration of the wings and the trick of lifting them was originally masculine; and that the male, having acquired his purple plumage, has still retained it, just as the dull-coloured grey forms of the tame

fowl still show off in a manner better suited to the richly-hued Jungle-fowl. That colouration and habits may be transferred from the male to the female we know ; many hen birds assume male plumage while still far from being senile and barren ; and in the English game-fowl and Indian Aseel the intense pugnacity of the male has been transferred to hens and chicks as well, although undesired. On the other hand, there is very good reason for supposing that the display-poses of birds are simply the method by which the particular species or natural group exhibits any excitement, sexual or otherwise, as the case may be. Take, for instance, that very excitable bird, the Turkey. The cock's showing-off position is that assumed by both sexes when fighting, the wings being dropped, and the tail raised and spread. So with the Common Fowl ; two cocks or hens meditating a fight assume the side-way-slanting attitude which is so characteristic of the courting chante-cler, and so well adapted to display the rich hues of back and wing found in the original black-breasted red—the Jungle-fowl colour. As showing the thoroughly instinctive character of the performance, I may mention that the Grey and Green Jungle-fowls (*Gallus sonnerati* and *G. varius*) show off in practically the same position as the tame fowl. So also do the ruffed Pheasants of the genus *Chrysolophus*—the Golden and Amherst—this genus being undoubtedly very near the Jungle-fowl. The hens of these Pheasants assume the slanting position when angry. In the Peacock many people must have observed that the young male will show off in due form before he has any train. I have heard that the hen assumes the show position when excited, and I recently saw a mere chick only about the size of a fowl take up this posture when alarmed by a cat. Among waterfowl the similarity of the gestures, under any excitement, of both sexes of the Muscovy Duck is very noticeable. The Swan also, whether male or female, exhibits either anger or sexual passion in the same way, in the latter case the wings being laid flat, and the plumage of the upper part of the neck puffed out. The lying out on the water as an invitation to pairing is a very marked gesture in the female Mandarin Duck (*Aix galericulata*) ; I have seen a mated female thus solicit her own mate on several occasions, and unmated birds have done the same with an alien drake. In London last year I saw, in St. James's Park, a pair of the allied Summer Duck (*Aix sponsa*) swimming along, while a common Park Mallard was swimming so as to cut across their course a little way ahead. Although he obviously had no intention against her, the female *A. sponsa* laid herself out on the water in the pairing posture of the female Mandarin Duck, pointing with her head to the Mallard. Immediately her mate rushed and drove the Mallard away, which was

what, I presume, she had wanted him to do ; and had made use of a stereotyped gesture of supplication for the purpose.—F. FINN (Indian Museum, Calcutta).

Correction.—In my note on the Yellow-billed Cuckoo (*ante*, p. 26), I regret to find I made a mistake in stating that a specimen was obtained on the shores of the Menai Straits in October, 1900. The date should have been Nov. 10th, 1899.—ROBERT H. READ (Bedford Park, London, W.).

PISCES.

Notes from Great Yarmouth.—Some most interesting examples of piscine aberrancies have lately passed through my hands, which are probably worth recording. The first—a freshly-caught hybrid Turbot-Brill—was purchased on the fish-wharf for me, on Jan. 13th, by Mr. R. Beazor, a local fish salesman, to whom I am indebted for securing me several good things. The fish weighed about five pounds. Its peculiarities may be described as follows:—The head and general shape resembled the Turbot; the upper skin decidedly the Brill in markings, touch, and colour, and without the spiny protuberances so noticeable in the Turbot. The tail was that of the Brill, and the under surface was, to my mind, more scaly than the Turbot. I sent it to Mr. Southwell, from whom it passed to Mr. Lydekker, who, I believe, has placed it in the National Museum.

On Jan. 29th I inspected a strange thing in the shape of a combined roe and milt, taken from a Herring opened on Mr. Blanchflower's potting premises. The "combine" was fully adult; two-thirds of it, from the fore-end, was well-defined roe, the posterior end being distinctly milt, spliced in after the fashion of a finger inserted into a linen-peg. A continuous skin-like membrane along the upper part connected the whole.

I had recently brought to me, by a sea-angler fishing from the jetty, the backbone of a Whiting, which was most peculiarly misshapen, reminding one somewhat of a flattened corkscrew. The angler had noticed the odd undulations in the fish before cooking it, and saved me the strange vertebræ.—A. PATTERSON (Ibis House, Great Yarmouth).

NOTICES OF NEW BOOKS.

Lamarck, the Founder of Evolution, his Life and Work: with Translations of his Writings on Organic Evolution.
By ALPHEUS S. PACKARD, M.D., LL.D. Longmans, Green & Co.

WHATEVER may be the general conclusion as to the claim of Lamarck being "the founder of evolution," there can be no possible doubt as to his life being the "old, old story of a man of genius who lived far in advance of his age, and who died comparatively unappreciated and neglected." The exact site of his grave "is and forever will be unknown"; his remains were not even deposited in a separate grave, and his bones are now probably in the catacombs of Paris, mingled with those of a very mixed humanity. His career comprised about twenty-five years devoted to botany, and he was in his fiftieth year when he assumed the duties of his professorship of zoology, and began his real evolutionary conceptions. This was in 1793, on the eve of the "Terror," and the dull thud of the guillotine "could almost be heard by the quiet workers in the museum." We wish our space would allow many extracts from this delightful narrative, for the old French zoologists and explorers cross the pages, and we learn much about men whose names are household words to most naturalists.

It is, however, with the views of Lamarck that Dr. Packard is most engaged; and, as an American, he appropriately defends the estimation of many of his scientific countrymen, who hold the French philosopher as even greater than Darwin. We learn that it was Lamarck who proposed the word "Biology," which first appears in the preface to his 'Hydrogéologie,' published in 1802. His definition of species has the true evolutionary ring: "Species, then, have only a relative stability, and are invariable only temporarily." As we read his views, one cardinal axiom seems always prominent: "It is not the organs—that is to say,

the nature and form of the parts of the body of an animal—which have given rise to its habits and its special faculties; but it is, on the contrary, its habits, its manner of life, and the circumstances in which are placed the individuals from which it originates, which have, with time, brought about the form of its body, the number and condition of its organs, finally, the faculties which it enjoys.” This, to very many, will probably prove a hard saying, but it is one which must be mastered with the context of Lamarck’s other views, before assent or dissent can with scientific propriety be asserted.

Lamarck was at least a natural philosopher far before his time, with the accidents of wealth, leisure, and powerful support absent from his career, which was pursued among many carping cares—an evolutionary Milton, with the last ten years of his life passed in darkness. Dr. Packard has now written the book which was wanted, and will for long remain the only biography of Lamarck, and the best defence of Lamarckism. We will conclude with the words of the author: “We are all of us evolutionists, though we may differ as to the nature of the efficient causes.” And may we not add that Lamarck preceded Darwin, as Erasmus did Luther?

Regeneration. By THOS. HUNT MORGAN, Ph.D. New York:
The Macmillan Company.

WE trust that this title will occasion no misconception; it has nothing to do with theology. The warning is not altogether absurd, as some years ago a certain novel entitled ‘Birds of Prey’ was gravely recorded in Germany among the ornithological publications of the year. Regeneration is here referred to as a biological phenomenon common to many animals, but of which the Salamander affords a sufficient example. “Salamanders also regenerate a new tail, producing even new vertebræ. If a leg is cut off it is regenerated; if all four legs are cut off, either at the same time or in succession, they are renewed. If the leg is cut off near the body, an imperfectly regenerated part is formed.” Dr. Morgan also includes plants as regenerate organisms, on the contention that the principal difference “is the development of the new part near the end,

rather than over the end, and, as in some cases, the new part may even appear in new tissue that covers the end, &c." The word "regeneration" has therefore in biology "come to mean, in general usage, not only the replacement of a lost part, but also the development of a new whole organism, or even a part of an organism, from a piece of an adult, or of an embryo, or of an egg."

In this book, which will be read with pleasure by all zoologists, there are two prominent features: *firstly*, a very full and complete exposition of the whole phenomena incidental to regeneration, with which few can, and probably fewer still will, cavil; and *secondly*, a distinct challenge of the doctrine of "natural selection." This last position in itself is a gain to those who hold with Darwin's original conception, as distinct from the new doctrine of some of his latest exponents. A theory only ceases to be one when the last difficulty is overcome, and, as Dr. Morgan well observes, "The custom of indulging in exaggerated and unverifiable speculation bids fair to dull our appreciation for hypotheses whose chief value lies in the possibility of their verification." As an example of our author's method in this discussion, which is throughout conducted in a fair, logical and courteous manner, we may quote the following sentences:—"All that natural selection pretends to do is to build up the complete power of regeneration by selecting the most successful results in the right direction. In the end this really goes back to the assumption that the tissue in itself has power to regenerate more completely in some individuals than in others. It is just this difference, if it could be shown to exist, that is the scientific problem."

Insect Life: Souvenirs of a Naturalist. By J.-H. FABRE.
Translated from the French. Macmillan & Co., Ltd.

WE recently had the pleasure of drawing our readers' attention to a book entitled 'Bird-Watching'; this publication might with equal felicity have been called "Insect-Watching," for both volumes are the result of bionomical observation. The author, estimated by Darwin as "that inimitable observer," is widely known by his 'Souvenirs Entomologiques,' of which there

are now seven series, this volume being a translation of the first.

To entomologists the work is, or should be, quite familiar, but it addresses a wider audience; to all who study bionomics it inculcates a method of painstaking observation which is almost unique. M. Fabre is an entomological Sherlock Holmes, as far as those insects are concerned which he has watched or "shadowed." He knows their whole proceedings, to some of which the terms murder and assassination are, we think, too frequently applied. Could a hymenopteron be heard in reply, it would probably retort that our slaughter of a sheep was in nowise different from their action of obtaining living provender for the sustenance of their young. When we read of the war waged by insect upon insect, we marvel more at the conclusions of some of the advanced school of mimickists, who would ascribe all colour for protection against larger but lesser foes.

M. Fabre claims to have exploded one error concerning the balls of dung so frequently seen rolled along by the Dung-beetles (*Scarabæidæ*). These globular masses were always supposed to contain an egg, but it appears they are the material for banqueting in subterraneous palaces, and that the large ball which does contain the egg is never rolled to the hole, but is constructed in it.

The book is very nicely illustrated; but we are quite sure that had its pages been submitted to Dr. Sharp, who wrote the preface, several entomological *gaucheries* would have been absent. We trust that the remaining series of the 'Souvenirs' may also soon appear in this translated and illustrated form.

A Textbook of Zoology. By G. P. MUDGE, A.R.C.Sc., Lond., F.Z.S. Edward Arnold.

ANOTHER text-book of zoology in these days of rapid publication should exhibit another method in treatment, even if new facts are hardly procurable. This volume certainly exhibits a considerable difference in the treatment of its subject to many other handbooks, and Mr. Mudge has produced a book which will probably be more useful to the zoological student than to

the ordinary naturalist, who only consults such writings, when considered necessary, as one refers to a dictionary or cyclopædia. Certainly this volume requires study, and without dissections are made to illustrate its teachings, much of the labour of Mr. Mudge may have been expended in vain.

Chapters xx. to xxiv. can, however, be read with pleasure and instruction by any zoologist, for such topics as Embryology, Heredity, and Variation, among others, not only appeal to the consideration, but demand the attention of every naturalist, however little he may regard the philosophical side of his subject. The chapter on Heredity is a particularly fair and concise exposition of that phenomenon, and can be appreciated alike by the followers of Eimer and the disciples of Weismann. The difficulty of finding a theory impregnable from all attack may be well understood when we examine the nature of some statements which are advanced as fundamental facts. Thus Mr. Mudge, in his tabulation of the "chief differences between the Cockroach and a Butterfly," states of the last-named that its antennæ are thickened "into a club at the tip," that the "fore wings are larger than the hind wings in both sexes," and that it "feeds, when it does so, entirely on honey which is obtained from flowers." Now these three statements are true in a general sense, but incorrect in an absolute one. In very many species of the *Hesperiidae*, the antennæ are not clubbed; in the genus *Dismorphia* the posterior wings are larger than the anterior ones; while though it would be agreeable to believe that these beautiful creatures feed on honey alone, the fact remains that some of the most brilliant representatives are attracted by the dung of animals, offal, decomposing Elephant meat, dead Stoats and Weasels, and, as Sir H. Johnston has informed us, even, like ghouls, by the blood-soaked ground after a human combat.*

Notes and Letters on the Natural History of Norfolk, more especially on the Birds and Fishes. From the MSS. of Sir THOMAS BROWNE, M.D.; with Notes by THOS. SOUTHWELL, F.Z.S. Jarrold & Sons.

No less an authority than John Addington Symonds has stated that the reputation of Sir Thos. Browne is founded

* Cf. 'Kilima-Njaro Expedition,' p. 176.

on his *Religio Medici* and *Enquiry into Vulgar Errors*, and some of his most remarkable tracts, such as *Hydriotaphia* or *Urn Burial*; but in this volume Mr. Southwell has shown Browne to have also been an observant Norfolk naturalist. It is pleasant to read that in those days “Bistardæ or Bustards are not vnfrequent in the champain & feildie part of this country”; and in a footnote Mr. Southwell states that Browne in 1681 was on the verge of discovering the presence of the gular pouch in this bird, first demonstrated by Douglas in 1740. The Hoopoe appears to have been not an uncommon bird in Browne’s days and aviculturists may be interested to learn that “Loxias or curuirostra” were known then to be “kept in cages butt not to outlive the winter.” Among fishes, Browne’s record of “a sword fish or Xiphias or Gladius intangled in the Herring netts at yarmouth” appears to be the only authentic record of this southern species in British waters.

If the charm of this book is to be found in the somewhat quaint chronicles of Sir Thos. Browne, its value certainly attaches to the copious and trustworthy notes of Mr. Southwell, promoted and assisted in some instances by Prof. Newton. These notes might stand by themselves as a commentary to the zoology of Norfolk, and have the merit—not universally found in annotation—of being accurate in observation, and also exhibiting a knowledge of the literature, and much of the *old* literature, on the subject.

EDITORIAL GLEANINGS.

We regret to read in the 'Athenæum' that "an eminent man of science has passed away in Emil Selenka, titular Professor of Zoology and Comparative Anatomy at Munich since 1896, when he resigned his professorship at Erlangen. Prof. Selenka, who was born at Brunswick in 1842, devoted his attention chiefly to the Echinodermata and vertebrate animals. He twice undertook a journey to the Sunda Islands and Java to study the anthropoid Apes. His most important works are 'Zoologische Studien' and 'Studien über die Entwicklungsgeschichte der Tiere.'"

We have received from Oxford the 'Thirteenth Annual Report of the Delegates of the University Museum (for 1900).' Anthropology is well represented at Oxford. The late Prof. Rolleston upheld the science in his day, and Dr. E. B. Tylor is the present Keeper of the Museum, which contains the Pitt-Rivers collection. Among the many donations to this grand collection, we read :—"A special, if melancholy and pathetic, interest attaches to the collection of West African objects formed by the late Miss Mary Kingsley, through whose untimely death the Museum has lost a sincere friend. It was the wish of this gifted and courageous traveller that her West African specimens should eventually come to Oxford, and her brother, Mr. Charles G. Kingsley, to whom the specimens were bequeathed in the first instance, most kindly transferred them at once to the Museum. Amongst them will be noticed several specimens of the now extinct artistic bronze-work of Benin, which has created so much stir of recent years, since the punitive expedition first brought these forgotten treasures to light; also a fetish figure, which is probably the finest of its kind in any Museum." The Report of the "Hope Professor of Zoology" is restricted to entomological acquisitions, of which a very large number are now being acquired and arranged under his direction.

Most British naturalists feel an interest in the now much restricted area in which *Papilio machaon* is found in England. Mr. C. W. Dale has contributed an article to the last issue of the 'Entomologist's Monthly Magazine,' entitled "Historical Notes on *Papilio machaon* in England," which supplies a very useful and timely information on the subject.

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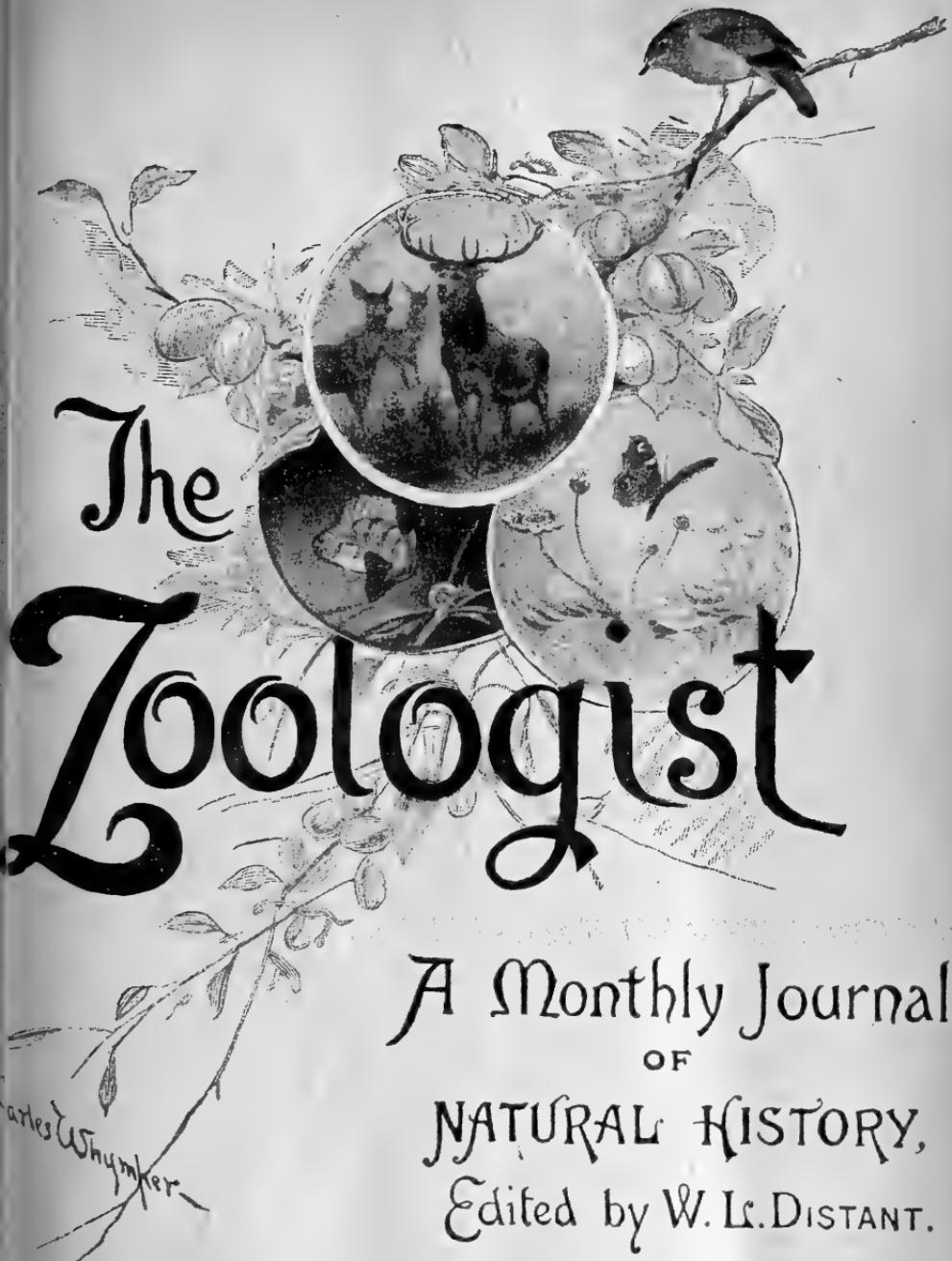
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THE ZOOLOGIST

No. 729.—*March, 1902.*

ORNITHOLOGICAL NOTES FOR 1901 FROM NORFOLK AND THE NORTH OF SUFFOLK.

By J. H. GURNEY, F.Z.S.

THE year's budget comprises several matters of interest to East Anglian ornithologists. To begin with the migrations—the chief of which were the Little Auks in February, the Bluethroats and Siskins in September, the Waxwings in November, and the Wood-Pigeons in December. The movement of the Wood-Pigeons was to the N.W., but this may have been only a local movement. I have never seen anything like their legions since the great flight in Surrey in December, 1877, but it is to be remembered that December is about the time when we in Norfolk always expect an increase. The fact is, the preservation of game has been immensely beneficial to the Wood-Pigeons, which are far too destructive to deserve any extraneous protection. We also had a good supply of Fieldfares, but Redwings and Bramblings were fewer. Mr. Patterson noticed Fieldfares searching for drowned worms at Breydon.

The chief rarities for the year 1901 are—a Lesser White-fronted Goose in January; a Golden Oriole, eight White-winged Terns, a Goshawk, and an Orange-legged Hobby in April; a White-winged Tern in May; a Woodchat in June; a Caspian Tern and two Avocets in July; some Bluethroats and a Roller in September; a Sabine's Gull and Tengmalm's Owl in October; and Allen's Gallinule in December.

The first Spoonbill was seen on Breydon mud-flats on April 12th, having come in with a strong north wind, and is believed to have frequented Breydon until the 21st, when it took its departure in fine weather; wind from S.E. (Jary). On April 26th, the wind being N.E. and fine, twelve more came, but remained only two days (Jary). They were no doubt from Hickling Broad, where the Rev. M. C. Bird, to whom I am indebted for much information, reports them as seen a few days before. On May 3rd Mr. Patterson observed another, seven more on the 7th, and two on the 16th and 17th feeding on young flounders about as big as a penny, or smaller. On the 26th he saw two, and three on the 30th; also two on June 2nd, four on June 7th, five on the 15th, and four on the 7th; and noticed that the large Gulls occasionally robbed them of their flounders. Mr. Patterson made a clever drawing, showing eight different attitudes assumed by Spoonbills, as an illustration to his 'Yarmouth Birds.'

From early April to the end of July the uncovered mud-flats of Breydon tidal broad were apparently never without from two to four Spoonbills, which were seen almost daily either by Jary the watcher, or by Mr. Patterson (*cf. Zool. 1901, p. 269*). These birds were observed with envious eyes by the fraternity of law-breaking gunners, who, however, were not allowed to destroy them. On July 23rd I had the opportunity of watching two fine birds,† but without crests, which were feeding with numerous Gulls, and only flew from one mud to another when put up. Their white colour against the sky whilst on the wing was very striking, and as with regular beats they flew round, they were recognizable at a great distance. In descending it was interesting to see the circles diminishing, until with one long sail, curving down, they resumed their position on the mud, keeping within ten or twelve feet of one another, their long necks extended sometimes for feeding, or bent back in repose, with bill inserted between the dorsal and scapular plumage. When flying the legs are fully extended, and so is the neck, which is slightly inclined upwards, as shown in Mr. Patterson's drawing.

The Spoonbills seemed to prefer the town-end of Breydon Broad, in spite of the noise of a railway-station and the hammering on a new bridge. It may be owing to the silting up of the

broad. The mud-flats on this part of Breydon water remain longest uncovered. On July 30th I found them at their old quarters, with many Black-backed and Black-headed Gulls, a Whimbrel or two, and a pair of handsome Sheld-Ducks. The Spoonbills were probably feeding on mud shrimps and worms; but a Heron which was near them caught a flounder. There was also an Avocet at the farther end of the Broad, where I did not go, the scene reminding me of days on the Nile, where a hundred Spoonbills may be seen in a flock, and Avocets also.

In the middle of July, as I learned from Mr. Pashley, there were a couple at Cley for a week or two, and another at the beginning of August, very likely the same which had been at Breydon; and it is satisfactory to know that the law was observed, and they were unmolested. There is really no more remarkable instance of what can be done by protection than the annual return of the Spoonbills in such considerable numbers to their ancient Norfolk haunts; but unless the Breydon Wild Birds' Protection Society receives more pecuniary support than it has had in the past, it will be unable to continue carrying on its good work. There is still a place in Holland fortunately strictly protected, where about six hundred Spoonbills nest in security (Sclater, Bull. B. O. C. viii. p. 10), from whence some think our stock come; but Mr. Patterson is informed that a new railway runs near their "spoonery," which is ominous.

The annexed copy (p. 84) of a photograph by Mr. G. C. Davies, represents a herony at Reedham, supposed to be on the same site as the wood in which the Spoonbills nested in Sir Thomas Browne's time. It is just on the rising ground above where the marshes commence, and I learn from the owner that there were nearly ninety nests this summer. No doubt, when Spoonbills nested there, their food supply was drawn from Breydon flats.

The fifteen Great Bustards which were imported from Spain, and turned down, feather-pinioned, near Thetford (see last year's Notes), as I learn from Mr. Hill, who has obliged me with reports from time to time, remained on the same estate until the middle of June, when, their wing-feathers being grown, all but four or five took their departure, and two were almost immediately shot at Farningham, in Suffolk. Both the slayer and his master were prosecuted, but this could not bring the Bustards to life

again. In October last the head keeper was still able to say that there were two males and two females left. These four were well guarded, but on Dec. 13th they had strayed as far as Mildenhall, near Newmarket (Howlett). However, on the 17th, they were safely back at their proper quarters, three of them flying strongly ; but the fourth, a female, has an injured wing.

It has been the worst Woodcock and Snipe season I remember for a long time. The "Red Partridge" (*Perdix montana*) did not turn up again, and its grey brethren were not particularly abundant. To the domestic Pheasant all seasons are more or less alike.

As usual, the Notes are arranged in the form of a diary. Occurrences marked with a dagger indicate that such specimens were examined by the recorder.



HERONRY AT REEDHAM.

JANUARY.

1st.—A Tawny Owl, quietly sitting on my retriever's kennel, was found early in the morning by the keeper going his rounds. It was caught without much difficulty, and on examination proved to have a disease, or rather a growth of flesh in the mouth, which

was no doubt the reason of its seeming tameness, and from which it soon died. Diseases among Wood-Pigeons are rather common, but I never heard before of such a case in a wild Owl.

4th.—A gathering of Long-eared Owls at Calthorpe, near the sea; also a Harrier and twelve Bearded Tits (R. Gurney). Twenty-five Whooper Swans at Hickling (A. Nudd).

5th.—Bittern booming (M. C. Bird).

7th.—A Dunlin† at Keswick.

8th.—Two Bewick's Swans at Yarmouth (B. Dye), and six at Hickling (Bird).

19th.—Bean-Goose at Yarmouth (Dye).

24th.—A Lesser White-fronted Goose (*Anser erythropus*, L.),† female, obtained in the Wash, and sent from King's Lynn, with some Coots and Knots, to a poultorer at Birmingham, was there detected by Mr. Coburn (Zool. 1900, p. 317), who secured it. Although a large specimen (measuring—culmen 1·5 in., tarsus 2·4 in., length 22 in.), there seems no doubt that Mr. Coburn has correctly identified it. He remarks that its legs were not yellow, but they would naturally change after death to a reddish orange, which is what Mr. Coburn describes them to have been. In this example, which, through the kindness of Mr. Coburn, was exhibited at a meeting of the Norwich Naturalists' Society, the white forehead extends nearly up to a point between the eyes, which is generally considered a distinctive mark of *A. erythropus*. Some ornithologists would unite *A. erythropus* and *A. albifrons*, but in that case the American *A. gambeli* cannot be kept apart, and there is an immense difference in size between the two extremes; and, as the habitats of *A. erythropus* and *A. albifrons* are to some extent different, although both inhabit Central Europe and some part of Asia, it seems undesirable to unite them. Seeböhm has done so, but they are kept apart by Count Salvadori, our latest authority. It is possible that a White-fronted Goose shot on Breydon in January, 1880, and described by Mr. Stevenson as somewhat small, may have been *A. erythropus*, a bird, as Mr. Coburn's specimen shows, easy to pass over.

FEBRUARY.

7th.—An unfortunate Bittern shot in the suburbs of Norwich, close to the City Road Station, where there is a small expanse of water (T. E. Gunn).

13th.—Mr. Gunn showed me a Slavonian Grebe,† and a few days afterwards I saw another, which had, in addition to a bright red eye, a beautiful inner rim of yellow next the pupil.

15th.—A Bewick's Swan† shot at Holt.

19th.—Disturbed a Wood-Pigeon from her nest in a fir-tree, in which were two eggs, in spite of snow being on the ground. This is a most erratic species as to nesting, and I certainly think Wood-Pigeons sometimes have four or five nests in a year. These are often such flimsy fabrics that it is a wonder how they hold together, and sometimes the glossy-white eggs can be seen through them. *A propos* of this subject, Miss Buxton saw a Wood-Pigeon flying with an egg-shell in its beak, which it afterwards dropped. From this no doubt a young one had been recently extruded, instinct probably prompting the parent to remove the shells.

22nd.—Mr. A. Napier, who resides at Holkam, informs Mr. Southwell that there have been more wildfowl on the Earl of Leicester's lake than he ever saw before, and he believes at one time there were 20,000 Ducks of sorts on the water, but only one Smew. Several Whooper Swans have also visited the lake.

25th.—At least three thousand Coots, or "Cutes," as they are locally called, on Hickling Broad; and afforded an extraordinary sight when, on being fired at by a flotilla of boats, perhaps nearly one thousand would rise in the air at one time, dispersing in every direction, but seldom leaving their beloved Broad. The same system of shooting is adopted as at Slapton Ley and the mouth of the Rhone, the object being to keep a good line and hem the Coots in, which, if properly done, the birds return over the boats. The tenacity with which they cling to the Broad is owing to their being day-feeders, for at night Coots often fly long distances of their own accord. How long these organized Coot-shoots have been in existence Mr. Bird is unable to ascertain, but certainly as long as any of the present marshmen can remember.

28th.—The month of February was again notable by a very considerable incursion of Little Auks, mingled with many young Puffins (a somewhat new feature), but I only heard of one adult Puffin from Mr. Patterson. It is probable that the adult birds, being stronger than young ones, are less at the mercy of the

waves, and keep further out to sea ; but the Little Auks which visit our coast always seem to be adult, or nearly so, and the sea does not spare them. Among many scores I have never yet handled one young enough to have a beak smaller than the normal size, which seems singular, as young Razorbills are not uncommon. The first reported Little Auks were met with by Mr. Ernest Gunn when walking along the shore at Caistor on the 14th. These were followed on the 20th by one at Northrepps, one at Overstrand, and others at different places, amounting altogether to over fifty, chiefly by the coast ; but one was carried as far as Weasenham. There was some variation in plumage, and Mr. Dye was the first to notice that sometimes the white neck was continued round the occiput. This I imagine to be perfect winter plumage ; and, on the other hand, Mr. Gunn had a specimen which had acquired a good deal of the black neck of summer. Both Mr. Gunn and Mr. Lowne, who were good enough to sex their specimens, found a considerable preponderance of females.

MARCH.

23rd.—At Scratby Gap, near Yarmouth, Mr. Patterson, searching along the shore, found several Little Auks, Guillemots, and Puffins, or their remains—the sea's rejectamenta after a gale from the east. He also discovered some dead Starlings, and at one spot eight Rooks, which had lost their lives in crossing.

25th.—More than fifty Blue Tits† in one small beech plantation. Wind from N.N.E., with sleet.

30th.—Gale from the south.

31st.—Many Grey Crows leaving Norfolk, and the following week (April 7th) hundreds were seen following the coast-line at Horsey (Bird). They always congregate on our coast about this time (*cf. Zool. 1886, p. 390*).

APRIL.

2nd.—About April 2nd a Shag,† not adult but well advanced in plumage, was caught alive, but in a helpless condition, close to Felmingham Hall, nine miles from the sea, and subsequently sent to me in a somewhat advanced condition by Mr. Plumby.

16th.—About this date Mr. Pashley had brought in for preservation a female Goshawk—always a rare bird with us—

which had been taken at Weybourne in a rabbit-trap. Last occurrence, March, 1893.

21st.—A Golden Oriole, a Pied Flycatcher, and a Norfolk Plover—signs of summer—all recently seen or captured near Yarmouth (W. Lowne). This Norfolk Plover, or another one, was taken on a boat (Dutt).

22nd.—S.E. Terns on Breydon, including a flock of eight White-winged Terns, which were identified by Mr. Jary. Wood-Sandpiper at Hickling.

25th.—Several Wood-Sandpipers, some Little Stints, and a Jack-Snipe seen at Hickling by a competent observer (Bird).

28th.—Male Smew at Barton Broad (Bird).

30th.—Mr. Lowne received an adult male Orange-legged Hobby from Acle, and at about the same time a Common Hobby† in change, and an Eared Grebe from Stalham. It is some time since a Red-legged Hobby has been recorded from Norfolk ; it was supposed to have been seen flying over Breydon a few days before it was killed.

MAY.

1st.—Wood-Warbler seen at Cranmer by Mr. C. A. Hamond, a local bird, and decidedly rare ; the Chiffchaff is also scarce.

3rd.—N.E. Fourteen Egyptian Geese on Breydon Broad (Jary). As many other African birds migrate to England and France, I cannot understand why this species in England should always be supposed to represent escaped birds. Its occurrence with us is no more remarkable than the occasional presence of such birds as the Greater Spotted Cuckoo, the Desert Wheatear, the Buff-backed Heron, and the Cream-coloured Courser, all likewise natives of North Africa.

13th.—A Woodcock's nest at Stratton Strawless, where the sitting hen was so tame as to allow people to stroke her, and even touch the eggs, which, not to be wondered at, were ultimately forsaken, but not until she had been several times photographed upon them. As she was known to have sat for twenty-five days, the eggs must have been infertile (Buxton).

15th.—A White-winged Tern on Breydon Broad, also some Lesser and Black Terns (Jary) ; wind N.E. the previous evening, and high.

16th.—N.N.E. Two Green Sandpipers and a pair of Com-

mon Sandpipers at Hickling, the male of the latter mounting up into the air, and "singing" like a Redshank (Bird).

JUNE.

1st.—Twenty-four Sheld-Ducks at Cley (F. H. Barclay).

2nd.—Mr. S. Bligh observed a Woodchat at Framingham Earl fly down from a high fence and take a large insect, the size of a May-chaffer, which it was carrying in its bill when it passed him; the under parts were dull white, the back black and white, the scapular feathers looking perfectly white, as in a male, which it probably was. It is many years since a Woodchat has been identified in this county.

14th.—A Grey Crow shot at Cromer by Mr. Barclay, who discovered some game-eggs which it had evidently sucked close by. Another seen by him near the same place on Aug. 9th.

18th.—Mr. Southwell found the Terns at Wells quite as numerous a colony as usual—the result of protection—but the nests more scattered than last year. The dead bodies of a few young ones, however, were lying about, and some eggs had been drawn into a hole by rats. Two nests each contained the unusual number of four eggs, and in a third nest was a white egg with two normal ones, of which Mr. Corder obtained a good photograph.

29th.—Disturbed a Hawfinch† at my pea-rows, and was astonished at the harm it had done; but I believe that the Jays are also answerable.

30th.—A young Hawfinch† caught in a strawberry-net at Cranmer (Davey). This bird was reared, but, being put into the same cage as an old male, was so pecked that it died.

Cuckoo Notes.—On June 17th a young Cuckoo, perhaps four days old, and quite unable to see, and with the back cavity still visible, was found in a Hedge-Sparrow's nest at Keswick. One Hedge-Sparrow's egg still in the nest, and two naked nestlings dead on the edge of it. A few days afterwards another young Cuckoo was found about fifty yards from the first one, and that was also in a Hedge-Sparrow's nest, and between the two Cuckoos there might be a week's difference in age. Cuckoo No. 1, being put in a cage, had of course to be reared by hand, which was a laborious business, it being nearly six weeks old before it knew

how to feed itself. From the first it seemed incapable of seeing any food presented to it; even a wriggling mealworm was not noticed, and it was evident that it fed by a sense of touch only, a habit which afterwards led to its death; for, being neglected, it refused to eat, although plenty of food was before it. Even when full-grown it seemed unable to find its food. Another peculiarity was that it always rose to eat, and without getting on its legs would neither accept nor eat anything. It then struck out at the hand which held the food, in the aimless way of young Cuckoos, at the same time generally uttering a low trill, which I particularly remarked, as some writers describe a young Cuckoo as quite silent. A correspondent describes a young Cuckoo as crushing caterpillars before eating them (*Zool.* 1896, p. 384), but mine did not treat mealworms in this manner, but swallowed them at once. At first the sunken eyes of this young Cuckoo were very noticeable, but by the time it was half-grown they were as prominent as in most other birds. The yellow mouth—at first so bright—also soon changed to a dull pink, and the beak became nearly black. When in the nest the position of the head is more bent back than in other nestling birds, and the eye, as I have said, more sunken. Good authorities have denied that the parent Cuckoo takes any subsequent interest in its offspring, but at the age of about thirty days my captive was visited by an adult Cuckoo, which was seen to flutter about the cage without actually alighting upon it. I did not myself see it, but the keeper's boy could not be mistaken.

On July 28th a third young Cuckoo was found, also in a Hedge-Sparrow's nest, all three being discovered by the noise made by the old foster-bird in feeding them. It was about four days old, and was within twenty yards of the second nest, all of them being placed in hedges in one garden. These youngsters were of a black tone of plumage, and must have been the offspring of the same female, judging from this and the remarkable proximity of the nests.

I may here mention that two Cuckoos did good service in the early part of May by repeatedly feeding (in the presence of my gardener) at Northrepps on a small caterpillar (*Cidaria prunata*) which infested the gooseberries. On the other hand, some gooseberry-bushes at Keswick, which did not receive their atten-

tions in this way, were spoilt possibly by the same larvæ. Very few birds except the Cuckoo will eat the "woolly bear."

JULY.

4th.—A considerable number of Great Crested Grebes seen on Ormesby Broad by the members of the Yarmouth Naturalists' Society, who are anxious to have them protected. Ormesby and Filby Broads were always a favourite haunt for Grebes, and I have seen a great many sometimes on Fritton lake.

21st.—A Caspian Tern, watched by Messrs. Patterson, Eldred, and Jary, fishing and plunging vigorously into the shallow water on a part of Breydon called "Rotten-Eye." The next day it was watched again, and was seen to capture an eel, after which, thanks to protection, it passed on. The wind at the time was W.N.W., light, with some fog, and the day before E.N.E., and the evening before that E. It is on this great tidal Broad that most of the British captures of *Sterna caspia* have taken place, but we have not had one to record since 1862.

29th.—E., fine. Two Green Sandpipers at Intwood stream (*cf. Zool. 1899, p. 122*) ; at Hanworth also from two to five have been repeatedly seen during the summer, but as yet no Norfolk naturalist has succeeded in finding a nest.

30th.—S.E., fine. An Avocet on Breydon Broad (Jary).

AUGUST.

4th.—My keeper lifted a Partridge off her nest, and, after testing the five eggs to see if they were fertile, put the bird gently back, without her resenting being handled, and the eggs afterwards hatched. Perhaps the Partridge was a hand-reared one, which would in part account for its tameness. I also had a nest in a stack, but, fearing accidents, hatched the eggs under a hen. Partridges are apt to be tiresome on a newly-sown bean-field, for not only do they attack the seed in May, but also eat the young plant when it is about an inch above the ground.

9th.—W. The Avocet still on Breydon muds, with Curlew, Whimbrel, Redshanks, Knot, Dunlin, and Ring-Dotterel (Jary).

12th.—About this date two Garganey Teal were shot near St. Bennet's Abbey, as well as a Shoveler and a Common Teal ;

while a Purple Heron was reported as having been seen at Yarmouth; doubtful!

18th.—S. The Avocet still on Breydon.

SEPTEMBER.

The first fortnight of September was marked by a considerable passage of Blue-throated Warblers, extending from Wells to Horsey, where Mr. Bird notes one on the 12th. This was immediately followed by a movement of Siskins and Redstarts, Mr. Bird remarking that he never remembered seeing so many of the latter: and I see from 'The Zoologist' (1901, pp. 425, 426) that the excess of Siskins was not confined to Norfolk. In Scotland the late Rev. H. A. Macpherson saw an immense flock of them ('Scottish Nat. Hist.' p. 53), and the migration reached Orkney Islands. It would be interesting to know if Heligoland shared in this migration, as it did in October, 1881. Mr. B. Dye writes that many Siskins were caught at Yarmouth, and the following is from Mr. Patterson:—"During the influx of Siskins, Mr. Odder, a local birdcatcher, observed an old lettuce-bed smothered with them. Borrowing a call-bird, he took his nets there next morning, and by breakfast-time had netted 90, and by noon had 140."

On the 2nd Mr. Roberts received a Roller† to preserve, but the carrier who brought it to Norwich declined to say where it was shot; and later on the same secrecy was maintained about a Fork-tailed Petrel.† Happily the blood of only a single Hoopoe has stained the ground this year; this bird has become nearly as rare in Norfolk as the Rose Pastor, which thirty years ago was not a very exceptional visitor.

12th.—A Solitary Snipe shot on Blakeney sand-hills by Mr. T. E. Gunn. I do not know if there is any significance in the fact that I saw some in Copenhagen on the same day at a poultorer's.

25th.—A grey Cuckoo seen at Potter Heigham by Mr. Bird, who was within twenty yards of it; very late for an adult.

30th.—About this date a Honey Buzzard† was shot at South-repps (Gunn), and another,† attempting to alight on the lee-rigging of a smack, fell back into the sea, and was captured alive. On being brought into Yarmouth, it was immediately announced

in the local paper as an Imperial Eagle! Neither in this nor last year has there been more than a single Rough-legged Buzzard to report, which is curious, as they are sometimes common.

The last three weeks of September were much too fine for bird-migration, and quite hot for the time of year. October 1st gave $75\cdot 5^{\circ}$ at a shaded thermometer of Mr. Preston's, a nearly unprecedented reading; but on the 2nd the weather changed, but only to be fine again on the 3rd. In consequence, ploughing for the autumn wheat-sowing, very backward (owing to want of rain); and in such weather no rarities were to be expected in the bird line. On Oct. 13th Mr. Bird gathered twenty-four species of wild flowers in bloom.

OCTOBER.

5th.—Eleven Norfolk Plovers† at Hevingham, where I learned from the owner of the land that a pair had bred this summer; he caught a young one. This considerable tract of heath is now the only resort of *Ædicnemus scolopax* in East Norfolk since Kelling Heath was deserted.

10th.—An adult Buffon's Skua,† shot at Beeston Regis by Mr. Hoare while flying over a turnip-field just after a gale there from the N.W., in which a ship was wrecked.

14th.—Grey Crows and Jackdaws streaming over (Bird). Little or no wind at Keswick.

19th.—Mr. Cole gave me an opportunity of examining an immature Sabine's Gull,† shot at Lowestoft yesterday, which makes the ninth local occurrence in this same month. It was in good condition, and weighed $7\frac{1}{4}$ oz., and was in the usual plumage. Wind on the 18th S., force 5; misty at Yarmouth.

27th.—About this time a considerable influx of migratory Larks, Finches, Martins, &c., noticed by correspondents.

30th.—Two Tengmalm's Owls picked up alive at Southwold, in Suffolk ('Field,' Feb. 1st, 1902), and another at Thornham (Archdale).

31st.—A Grey Shrike,† of the variety called Pallas's Shrike, brought into Yarmouth by a fishing-smack. Mr. Dutt writes that other trawlers have been visited by migrants; a Starling alighted on one, followed by a Sparrow-Hawk, which was killed by the fisherman with his boot. Mr. Dutt found a Partridge

washed up, but this may have been one frightened out to sea. High wind from the E.N.E. on the 30th, and gale on the 31st.

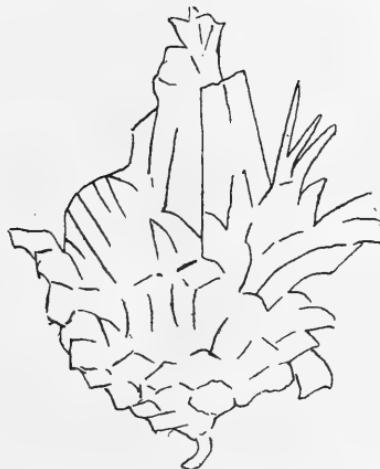
NOVEMBER.

1st.—Greater Spotted Woodpecker at Yarmouth (E. Saunders), after a gale from E. There is no European Woodpecker so migratory as *Picus major*. Others afterwards in the same neighbourhood, and two sent to Mr. Cole, of Norwich, and one to Mr. Gunn.

2nd.—Quail shot at Palling, by the coast, and another on the 15th, had their crops full of seed, chiefly of wild goosefoot (*Chenopodium album*), (Bird).

11th.—*Woodpecker Notes.*—A Great Spotted Woodpecker† (*Picus major*) has lately, day after day, and generally in the morning, been seen upon the withered brauch of a large stone-pine (*Pinus pinea*)—always the same branch—hammering at it with might and main. This hard labour has now been going on regularly for a fortnight. Sometimes it hammers at the dead bough, and sometimes at fir-cones placed on the bough, which it may be seen to gather from a couple of adjacent Scotch firs (*P. sylvestris*) ; but it is always on this particular bough, which has some mysterious attraction. Having placed the cone in position, it begins near the apex, where the scales have not expanded, and picks as much of it to pieces as is needful in its search for the seeds, which lie between the scales, leaving the hard base untouched. It probably jams the cones into a crack, or it may be into a hole which it has made in the dead branch. Such holes are about the size of a shilling, and are not uncommon ; but it never struck me before that they were intentionally made as receptacles. Occasionally this amusing bird will take a cone in its beak, look round to see that the coast is clear, and then, if the observer remains quite motionless, resume its hammering. It never sits crossways, and each hammering only lasts a few seconds, but is very resonant. Probably it extracts the seeds, which are very small, by means of its long tongue—1·5 in. in length—which is furnished with a horny and no doubt glutinous tip ; but I suppose it can only get them by this means when the cone is ripe, and the scales expanded. The tongue of a Woodpecker is indeed a singular organ, curiously adapted for its purpose, and is beset at the end with little barbs. When at work on its favourite branch

its whole body swings with every blow, with such vigour are they given. The stiff rectrices, which are graduated to a point, and have hard webs, are certainly a support in this sledge-hammering process, and equally are they of use in climbing. Often it may be seen hammering when it has dropped its cone, but this is either pure ebullition of spirits, or in order to keep its beak down. Woodpeckers are occasionally seen with malformed beaks, but a dead bough is a tempting sounding-board. This bird is a female, which disposes of the supposition (Zool. 1901,



Fir-cone chipped by *Picus major*.

p. 97) that it is only the male which hammers. When first observed by my neighbour, Mr. Knight, it was in a large nut-bush in his garden, attending to a cob-nut, and it was not until this bush and the next one were pretty well cleared that it betook itself to the fir-cones. Here, under its favourite branch, the ground is now (Nov. 19th) strewn with dropped cones. Now and then, when it is not at work hammering, a "quat quat" can be heard, and this is the only vocal sound which has proceeded from our handsome visitor, and might easily pass unnoticed. Prof. Newton says they also sometimes utter a low "tra tra tra" ('British Birds,' ii. p. 471).

22nd.—Sometimes the distant tapping of another Woodpecker could be heard, but it was not until to-day that we located her; for it was again a female. She was in a large oak-tree, and here she remained several days feeding entirely on the grubs contained

in oak-galls. Once or twice she was seen flying with one in her beak, and in one instance holding a twig several inches long, which she had just picked with the oak-gall attached to it, and which she afterwards dropped at my feet. Most of the galls on the ground had been halved very neatly, and, as some which I obtained for examination contained as many as six little white grubs, they were worth the trouble of opening.

23rd.—Wood-Pigeons arriving in swarms at Taverham, where there are extensive coverts (E. F. Penn), and a large increase noted at Keswick and other places; but of this more subsequently. Between the 17th and 27th Waxwings were reported from Lowestoft, Yarmouth, Filby, Burgh Castle, Hickling, Side-strand, Cromer, and Sheringham; but the flight must have rapidly passed on, and does not seem to have been followed by others. By the end of the month they had got to Newmarket (W. Howlett).

DECEMBER.

4th.—Only one Spotted Woodpecker at Keswick now, but that remains constant to the same two fir-trees, which it is gradually stripping. There are at the present time three or four hundred Scotch fir-cones on the ground, all dropped by the Woodpecker, and nearly all from the same dead bough. Besides this, about twenty are jammed into the trunk of the tree, which, being a stone-pine, has interstices in the bark large enough to receive them. Although the Nuthatch does the same with nuts and seeds, I never detected it in *Picus major* before. In my last year's "Norfolk Notes" a description was given of a knob as big as a pea on the lower mandible of the nestling Green Woodpecker. I have since ascertained that the Greater Spotted Woodpecker also has this peculiar growth, but less developed, and it has also been detected by Mr. H. Noble in *Gecinus sharpii*; but what its object can be is difficult to divine. *P. major* is not an uncommon bird in Norfolk, and anyone may hear its rapid hammering, which is loudest in the spring, taking the place of the vocal love-song in other birds. It is much more seldom to be seen upon the ground than the Green Woodpecker, and is more of a fruit-eater, but does not feed on ants. I once had a nest in a plum-tree in my kitchen-garden, well within reach of the hand; another nest was in an alder, and a third one in a birch,

the bark of which had many scratches on it made by the Wood-pecker's claws. The eggs are glossy white; as many as seven were on one occasion taken at Hempstead, but I cannot remember now what sort of tree the hole was in. I believe this species to be very omnivorous, and have even once known an instance of its eating young birds, as well as the larva of the Leopard Moth.

8th.—*Great Flight of Pigeons.*—For several days past large arrivals of Wood-Pigeons have been noticed, probably from Scotland, where I am told there have been great numbers. They are destructive birds, and have this summer completely cleared a garden at Northrepps of peas. Generally they prefer turnips and acorns, and have no objection to acorns which have begun to sprout. Their crops are very dilatable, and they can easily stow away thirty or forty large acorns, or five hundred black ivy berries without inconvenience, or two or three wine-glasses of oats or elder berries. In fact, there is nothing they will not eat—roots, green crops, cereals, from the time they are sown to the time they are harvested, are at their mercy. With such qualities, this increasing species should be kept in check wherever practicable.

11th.—From about 7.30 a.m., or earlier, to 8.45 a.m., Wood-Pigeons at the rate of forty per minute were passing my house, most of them in flocks of from twenty to forty, flying at an average height of about two hundred feet, and all going N.W., against the wind, which was light. I never saw so many here before, and think the whole country-side must have furnished contingents. It had been fine, but at 11 a.m. it began to rain, and poured all day without ceasing, and by 9 o'clock next morning there was 1·55 in the rain-gauge. This was the biggest downpour of the year, and to it no doubt the movement of Pigeons was due.

12th.—Again, at the same time in the morning, flocks of Pigeons were to be seen going N.W., but the total was very much less than yesterday. Shooters were not slow in availing themselves of so many "Cushat doos," and at Weston, Witchingham, and Morston bags of nearly one hundred were made in a few hours. It was to this line of country that they seemed to be confined, correspondents at Cromer, where there are large woods, reporting only a few, while Mr. Penn, who was shooting

near Lowestoft on the 10th, 11th, and 12th, was struck by their scarceness.

19th.—My nephew saw a Peregrine Falcon at Cley.

29th.—Another great arrival of Wood-Pigeons having taken place at Taverham, Mr. E. F. Penn went to the coverts by the river at 11.45 the following morning, and in about three hours bagged one hundred and twenty-nine to his own gun; but going again with his father the day after, expecting great things, they hardly saw any. He says at one time in some coverts at Attlebridge near there, where there are a lot of big dark fir trees, it was quite a wonderful sight when the Wood-Pigeons went in to roost, "just like Starlings in a reed-bed," and they seemed to be packed as tight as was possible. Bags of twenty-seven, thirty-eight, forty, and fifty-four were made up on ordinary days covert shooting, when no special pains were taken to circumvent them. I believe there were very few Stock-Doves; I did not see any. For lying-up for Wood-Pigeons a few "decoys" are a great help, but they must be head to wind, and there is a good deal of judgment required in placing them. Above all, it is essential that the shooter be himself well concealed.

31st.—On the last day of December,* a Gallinule† of a cinnamon colour, and about the size of a Moor-hen, alighted on a fishing-boat off Hopton, a village near Yarmouth, and being caught was taken to Mr. Walter Lowne. With the assistance of books and skins, kindly lent by Prof. Newton, it was decided that the stranger was an immature Allen's Gallinule (*Porphyriola allenii* (Thompson)), resembling the hind figure in the plate in Dresser's 'Birds of Europe,' a native of Africa which has occasionally occurred in the south of Europe, and has also been taken at sea. Two days afterwards it was still alive at Mr. Lowne's house, showing no signs of confinement, except in being tame, which Porphyrios generally are; and as there was a high wind from S.W. at the time of its capture, I think we may look upon it as a wanderer strayed from the south. I know that the time of the year is somewhat against this theory, but Prof.

* I learn from Mr. J. B. Nichols that the Allen's Gallinule was not captured on Dec. 31st, but on the morning of Jan. 1st, when the wind was again W. S. W., but had moderated a little, and the weather was rather misty at Yarmouth.

Giglioli, of Florence, writes that *P. alleni* has been taken both in Italy and Sicily in December; see also Giglioli, 'Avifauna Italica,' pp. 353, 354. It is also true, as Prof. Newton remarks, that few species escape from a cage more readily than those of this genus, because they look bulky, while in reality they can squeeze through a very small opening. Enquiries ascertained that it was not a fugitive from Woburn Park, where a number of *P. smaragdonotus* were turned out in 1896 and 1897. All Crakes and Gallinules are wanderers, because they fly high and are probably easily carried away by storms, and it is easier to explain the appearance of *Porzana maruetta* in Berkshire and the Hebrides, of *Porphyriola martinica* in Ireland, of *Aramides cayennensis* in Wiltshire, and of *P. alleni* at Yarmouth by the theory of their being storm-driven migrants assisted by ships, than by the alternative theory of escape. There are scores of authentic records of Water-Rails, Corn-Crakes, Gallinules, and Porphyrios being caught on ships. On the same day a large Diver†, thought at first to be Adam's Diver, was picked up on the shore at Caister, and taken to Mr. E. C. Saunders; but although nearly the whole of the lower mandible and about two-thirds of the upper were white, the bill was not sufficiently upturned for that species, judging from Prof. Collett's plate and article and from my father's Pakefield specimen. Neither can I at all think that the specimen figured in Babington's 'Birds of Suffolk' is really *Colymbus adamsi*, though he thought it was. Our museum contains a good example from the north of Norway, obtained at Tromsoe by Col. Feilden, which shows clearly the difference in the bill.

AVICULTURAL NOTES.

Eagle Owl.—On February 1st one of my late father's Eagle Owls died; it was believed to be between thirty and forty years of age, and a few weeks after its companion, thirty years old, also died. My father had many of these fine Owls, but he never equalled the success of Mr. Meade Waldo, who has two in Kent, one of which—the male bird—is undoubtedly seventy-one, and the other—the female—is believed to be fifty-six, and is the parent of ninety young ones. Compared to such Nestors our birds were juvenile. There is no easier bird to keep than this

hardy Owl, but if two males are together they will fight, and probably claw out an eye. It is evident that the Eagle Owl can see but very imperfectly in the daytime. The iris is very yellow in the young bird, but gets much lighter after eighteen months. In few birds do the pupils dilate more, and in the sitting bird, when exhausted with the labours of incubation, they become almost white. The eyes get weak if they sit long in the sun ; and if one eye is exposed to the light, and one is in the shade, one pupil is then much larger than the other. The ear-tufts are depressed in repose, but if a dog or a stranger appears they are immediately erected, and the whole bird swells itself out in a very formidable way, snapping its mandibles with a loud noise, which is done in the act of opening, not in closing them.

Pintail hybrids.—Mr. Knight had three broods of Pintail × Wild Duck hybrids from the same birds which did so well on his pond last year, some of which by June 16th were three weeks old, but unfortunately several of the young died from the drought, and some which I took charge of were killed by rats ; but it proves the facility with which the Pintail and Wild Duck interbreed. Two pair of Mr. Knight's hybrids placed on separate ponds have, however, shown no signs of breeding again.

Black Lark.—On Oct. 30th a Black Lark (*Melanocorypha yeltoniensis*) died after eating a piece of yew, though it had only bitten off a few tips. Subtle as is the poison of the yew, I do not remember to have heard of a cage-bird succumbing to it before, but I have known Partridges killed by it, and Pheasants have been poisoned (see 'Field,' Nov. 25th, Dec. 2nd, 1876). *M. yeltoniensis* has been taken in Belgium about a dozen times, so the appearance of this handsome bird may be expected some day in East Anglia.

LYNCEUS AND THE LYNCEIDÆ.

BY THE REV. THOMAS R. R. STEBBING, M.A., F.R.S.,
F.L.S., F.Z.S.

IN recent years a great impulse has been given to the study of Crustacea by the numerous expeditions sent out more or less expressly for the purpose of deep-sea exploration. As the result of voyages carried out in rapid succession through the last forty years, a host of forms distinguished for novelty, queerness, or beauty have contributed interest and animation to the pursuits of the carcinologist. The species popularly attractive have for the most part, though by no means exclusively, belonged to the Malacostraca. But during the same period in which the higher marine Crustacea have been thus decidedly making their mark, it happens that in a quite opposite direction the fresh-water Entomostraca have found their way to a modest celebrity. Though not many of them are of any considerable size, they attain in various ways to economic importance by their astonishing abundance. Of those that can be easily captured in almost any pond or ditch the variety is very considerable, and the number of species obtainable can be largely increased by a little extra exertion, without any appeal to imperial resources. Apart from ordinary methods of fishing for them at the sides or in the centre of pools and watercourses, that which more than anything else stands in antithesis to the costly labour of dredging and trawling in submarine abysses is the process, applicable at least to many fresh-water Entomostraca, of dredging on dry land. Many sheets of water at certain seasons completely evaporate, and expose a moistureless floor. If earth be taken from this and placed in water, under suitable circumstances of temperature, there is a good prospect that a crop of Entomostraca will be raised from it. The secret is that crustacean eggs have been deposited in the soil, and have there been biding their time till conditions appro-

priate to aquatic creatures should once more revisit their thirsty and solidified home.

Of the three orders—Branchiopoda, Ostracoda, and Copepoda—into which the Entomostraca are commonly divided, the present paper touches only the first, and that in two of its divisions—the “leaf-limbed” Phyllopoda, and Cladocera, with conspicuously “branched antennæ.” The former especially excite surprise, when they are successfully grown from dried mud, because of their superior magnitude. Some of them also are remarkable for having no carapace, others for being almost entirely enclosed in what looks like the shell of a bivalved mollusc. The Cladocera are closely related to the Phyllopoda, and are most widely known through the little Water-Flea (*Daphnia pulex*), which, though little, is much larger than the *Chydorus sphaericus*, to be presently mentioned. The labours of G. O. Sars in Norway, of W. Lilljeborg in Sweden, of Jules Richard in France, of G. S. Brady, D. J. Scourfield, and Thomas Scott in Great Britain, and, in truth, of quite a multitude of learned writers all over the world, have discussed almost every conceivable detail in the structure, habits, and distribution of these animals. Even as to their classification, a very near approach to agreement has been arrived at. All the more desirable is it that every source of confusion should, if possible, be eliminated from the names in common use. But in regard to the genus and family which form the subject of this paper, there is something a little parallel to “the strange case of Dr. Jekyll and Mr. Hyde.” It is the object of the following discussion to unmask them, in the sense of showing what are the animals to which the designations that form the title of this paper should rightfully be applied.

It is said of mud that, if you throw plenty, some of it is sure to stick. With scientific names there is an understanding that, if they are thrown according to the rules of the game, they ought to stick at least to some of the objects at which they have been thrown. In early attempts at classification a generic name is often attached to an incoherent miscellany of species. When these are subsequently assorted under appropriate headings, the original generic titles do not always quite know where they are. They stand a chance of being left out in the cold, as things no longer wanted—a kind of disinherited vagrants, blissfully for-

gotten, till some meddling bibliographer disturbs the peaceful oblivion in which their claims lie buried.

When Otho Fridrich Müller, in 1785, definitely established the genus *Lynceus*, which he had already brought forward in his 'Prodromus' of 1776, he assigned to it nine species, the first being *L. brachyurus*, the second *L. sphæricus*, a variation from the order adopted in the earlier work. That these nine species have since been distributed among numerous genera is well known; but in this distribution the true position of the genus *Lynceus* has been lost sight of. Since Müller singled out no species as typical of the genus, it was at the outset open to anyone, in dividing the genus, to allot the original name to which species he pleased. No stress whatever can, in my opinion, be laid on the circumstance that Latreille, in his 'Considérations générales,' pp. 91, 421 (1810), mentions '*Monoculus brachyurus*, Fab.,' as a typical example of *Lynceus*. He was not discriminating between species and species, and was pretty evidently without the knowledge requisite for doing so. So far as he is concerned all the nine species remain exactly where Müller placed them. There is no hint of an idea that any ought to be transferred to a separate generic division. It is different with Dr. Leach, for he, in 1816, definitely began that partition of the genus which has since been greatly developed. When describing the Crustacea as a division of the Annulosa in the 'Encyclopædia Britannica,' p. 416 (1816), Leach assigns to *Lynceus* the single species *brachyurus*, and to a new genus *Chydorus* the single species *sphæricus*. The inference, then, can scarcely be escaped that, whatever else happens to these two genera, neither can be upheld without at least including in it the species assigned to it by Leach. Desmarest, in 1825, rejects *Chydorus*, upbraiding Leach for having established it merely upon Müller's error in regard to the antennæ. Desmarest himself, whose acquaintance with the subject was not very profound, includes five species under *Lynceus*, but says never a word about *L. brachyurus*. His objection to *Chydorus* has been overruled, and with good reason, since, however weak the distinction drawn by Leach, the application was put beyond doubt by the references which he gives to the species above mentioned. Subsequently Dr. Baird distributed six of Müller's species over the genera *Eurycercus*,

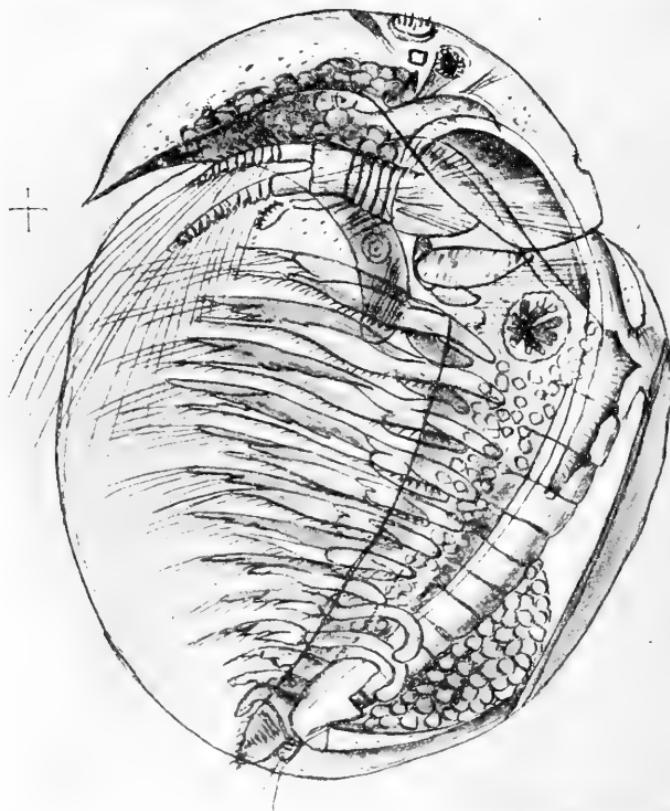
Chydorus, *Campnocercus*, *Alona*, *Pleuroxus*, and *Peracantha*, these, with the genus *Acroperus*, forming his family *Lynceidæ*. Here it is a little startling to observe that the family *Lynceidæ* is set up, but the genus *Lynceus* itself is shut out. Also three of the Müllerian species are not accounted for, namely, *L. brachyurus*, *L. longirostris*, and *L. socors*. Of these Baird refers the second to *Bosmina*, as a genus of the *Daphniidæ*; the third is perhaps unidentified; the first remains over for consideration.

In 1867 Norman and Brady, in their well-known paper on "The Families *Bosminidæ*, *Macrothricidæ*, and *Lynceidæ*," reassemble, under the title *Lynceus*, no less than eleven genera, no one of which, however, includes any of the three species omitted by Baird from the family *Lynceidæ*. The principle on which these two authors acted was that for generic distinction structural characters should be insisted on rather than variations of form. Though they do not make it very clear how the line is to be drawn between form and structure, there was something to be said for their opinion that generic subdivision in the family had been carried beyond the point which was justified by any thoroughness of contemporary knowledge. None the less they recognized the importance of the treatise by G. O. Sars on the 'Cladocera Ctenopoda,' 1865, and they contemplated the possibility that in the future some or all of the rejected names might properly be reinstated. This has come to pass. But authors have still been content to follow Baird in adopting a Cladoceran family *Lynceidæ*, in which no genus *Lynceus* was included, although of other generic names within that family the number has risen to at least eighteen. At length, however, in his 'Cladocera Sueciæ' (1900 or 1901), the veteran zoologist, Wilhelm Lilljeborg, raised a protest against this way of treating O. F. Müller's genus, and restored it in favour of *Lynceus quadrangularis*, Müller, which Baird had transferred in 1843 to a new genus *Alona*. But, as already explained, the action of Leach has affixed the title *Lynceus* to the species *L. brachyurus*. Accordingly, in any settlement of claims it is to that species that attention must first be given. It has nothing to do with *Alona*, for it is not one of the Cladocera at all. It's a phyllopod, and, as may be seen from the 'Fauna Norvegiæ' of G. O. Sars (vol. i. p. 116, 1896), in which it is fully described

and beautifully figured, it belongs to the genus which Lovén called *Limnetis*, and Lièvin called *Hedessa*. Both those names, therefore, are superseded by Müller's *Lynceus*, as limited by Leach. As a further consequence the family *Limnetidæ* must yield its name to *Lynceidæ*, which takes rank as a phyllopod family; while in the Cladocera the name *Lynceidæ* must be discarded in favour of a family *Chydoridae*, *Chydorus* having been detached earlier than any other Cladoceran genus from that fruitful mother of genera, Müller's *Lynceus*.

Since there is reason to expect that the changes of nomenclature above introduced will not be greeted with any rapturous enthusiasm by all zoologists, it may be good policy to ward off the "precious balms" of rebuke by evidence that the changes are not unsupported by precedent. In 1865 Sars established a family *Lyncodaphnidæ*, which Lilljeborg still upholds. But already, in 1867, Norman and Brady had substituted for it the name *Macrothricidæ*, with the explanation: "Sars' name for this Family 'Lyncodaphnidæ,' not being derived from the typical genus of the Family, in accordance with the usually received rules of nomenclature, we have substituted for it that here employed." It may of course be urged that this was only a youthful delinquency on the part of two authors whose acknowledged eminence is of later date. But such an argument will fall very flat in face of the circumstance that G. O. Sars himself, with the openmindness habitual to him, has now accepted the name *Macrothricidæ*, using it prominently in his papers of 1900 and 1901 on South American Entomostraca. Some may even now prefer the scholarly emendation *Macrotrichidæ*, long ago proposed by Dr. E. v. Martens in the 'Zoological Record.' The common outcry, that there is no "compensation for disturbance" in these rearrangements of nomenclature, is itself very inconsiderate. There can never be any fixity until a settlement has been carried out on the thoroughgoing application of sound principle. In the present instance the student of Cladocera should feel himself in a very happy position. By obedience to law he is involved in nothing worse than the sacrifice of the name *Lynceidæ* in favour of *Chydoridae*. If he persists in wrongfully retaining *Lynceus* as a Cladoceran genus, he must sacrifice for it *Alona*, Baird, instituted in 1843, which has not

only been current for nearly sixty years, but has suggested the names of the nearly related genera, *Alonella*, *Alonopsis*, *Euryalona*, *Pseudalona*, and the specific name of *Camptocercus aloniceps*, all to be made cryptic by the burial of their parent. Seeing that the species of *Alona* itself are numerous, convenience and principle are not in conflict over its validity. They are alike interested in upholding it.



Lynceus brachyurus, O. F. Müller. Left valve removed. After Sars.

THE BIRDS OF BARDSEY ISLAND, WITH ADDITIONAL NOTES ON THE BIRDS OF LLEYN.

By O. V. APLIN, F.L.S.

(Concluded from p. 17.)

I HAVE added the following to my list of the birds of Lleyn :—

DIPPER.—One in the river at Afon Wen, May 29th, 1901.

COAL-TIT.—Llanbedrogg, May 27th, 1901.

TURTLE-DOVE.—Bardsey.

REDSHANK.—A pair flew over my head when I was at the Afon Wen meres ; they were going to another part of the meres, which cover a good deal of ground, and they may possibly breed there.

COOT.—I counted forty-one old birds on one of the large reedy meres at Afon Wen on May 29th. Messrs. T. A. Coward and Charles Oldham, who were in Lleyn for a few days after I had left, found three or four pairs of Coots at Llyn Glâs fryn, near Pwllheli.

LITTLE GREBE.—To judge from the chattering cries which came from the reeds, this bird is common at the Afon Wen meres. I saw one adult on the open water. These meres presented quite a pleasing scene of bird-life ; besides the Coots and Dabchicks, there were numerous Wild Ducks with young broods, Moor-hens, and a pair of Swans. A sandy spit running out into the water was occupied by a pair of Oystercatchers, a Ringed Plover, and a Common Sandpiper ; while a pair of Redshanks and a calling Whimbrel flew low overhead. Numerous members of the Swallow tribe skimmed over the water, and Sedge-Warblers rattled away in the reeds. A prolonged search might reveal Water-Rails, and perhaps other species. Messrs. Coward and Oldham saw one pair of Dabchicks with young, and at least one other bird at Llyn Glâs fryn.

GOLDCREST.—Messrs. Coward and Oldham heard one singing in a small wood at Boduan.

GANNET.—In my former papers I omitted to include the Gannet. Mr. Coward saw an adult bird off Llanbedrogg Head on June 9th, 1887, and others off Nevin. I have several times seen adult Gannets on the other side of Tremadoc Bay in May ; they doubtless come from Grassholme to feed.

GREAT NORTHERN DIVER.—Mr. Coward found the dried remains of one in winter dress in Abersoch Harbour. I have no doubt that Divers are not uncommonly to be seen off this coast. I once saw two Great Northern Divers off Barmouth in May, and at that season the Red-throated Diver is not at all uncommon there. One morning I saw as many as nine feeding in the shallows.

I add some notes on Lleyn birds already recorded :—

PEREGRINE FALCON.—I ascertained the position of the eyrie of another pair which breed annually in Western Lleyn. Mr. Coward saw last year the birds at a previously-recorded eyrie.

MERLIN.—Seen by Messrs. Coward and Oldham last year in May at Cilan.

RED-BACKED SHRIKE.—On May 23rd, 1901, I found a pair, with a nest and two eggs, in a bramble-bush on the cliffs about half a mile west of Aberdaron ; an interesting extension of its known range in this direction ; almost in sight of Ireland, where this Shrike is practically unknown.

MISTLE-THRUSH and **HOUSE-MARTIN.**—We all three agreed that these birds were more common last year than we had previously known them ; the former seems fairly common.

GRASSHOPPER-WARBLER.—We heard in the marsh at Abersoch.

GOLDFINCH.—I noticed at Llanbedrogg, and Messrs. Coward and Oldham at Abersoch and Boduan.

CHOUGH.—Messrs. Coward and Oldham observed it at an inaccessible spot on the north coast.

WHIMBREL.—Evidently not uncommon on the spring migration. I saw two alight on St. Tudwal's Island, and several others passing over the district.

PURPLE SANDPIPER.—Reported by the lighthouse-keeper as present on St. Tudwal's Island again this May—about the 24th.

LESSER TERN.—I saw a pair in Hell's Mouth Bay, and another at Abersoch ; and Mr. Oldham reported a score in Pwllheli Harbour on June 2nd.

TERN (COMMON or ARCTIC).—One or two seen in Pwllheli Harbour on May 29th by Messrs. Coward and Oldham.

HERON.—I am told that there is a herony near Pwllheli. Herons are generally to be seen in Abersoch Marsh ; on May 26th two rose from the marsh, one of which held in its bill a wriggling eel about a foot and a half long.

SHAG.—More breed on the islands (where they are quite safe) than

I thought. I saw several on their nests in the cave ; others I saw on their nests at Pen y Cil.

GREAT BLACK-BACKED GULL.—A pair has been known to breed on Careg ddu, and another on the mainland at the far end. One can never be certain of finding a particular nesting spot occupied in any particular year.

GUILLEMOT.—I visited, in a boat, a small colony in Ogof urel (? uriel), at Pen y Cil, on May 24th. The birds on the ledges were all facing the sea, and probably had not laid their eggs. A local name used here and on Bardsey is "Aron" or "Arron." It is probably onomatopætic. I have never previously met with this curious name in use, although I believe I have seen it in print somewhere. However, I have searched in a great many books, old and new, without finding it.

Mr. Coward, to whom I am again indebted for the valuable notes he made, has given me particulars of the great breeding station of sea-birds on the Bird Rock near Nevin, which I have not yet visited. It is three or four hundred feet high. Near the top are Cormorants and a few Herring-Gulls ; lower down, Guillemots and Razorbills in thousands, and below them again great numbers of Kittiwakes. Jackdaws, Carrion-Crows, and Rock-Pipits were among the other birds noticed. No Lesser Black-backed Gulls were seen, but a pair of *Larus marinus* haunted a small stack, which, however, held neither eggs nor young. As far as I am aware, the Lesser Black-backed Gull is rare in Lleyn, and I know of no instance of its breeding in the district. Mr. Coward saw one between Pwllheli and Llanbedrog on June 3rd, 1887, and two on Llanbedrog Head four days later. Herring-Gulls used to breed on the headland there, but the part of the cliff they bred on has since been quarried away. I have only very occasionally seen the Lesser Black-backed Gull in Lleyn in May and June.

The Lesser Whitethroat and Ray's Wagtail must be struck off the Lleyn list for the present. The inclusion of the former rests on the identification of a single egg found in a nest near Abersoch. Mr. Coward submitted the egg at the time to a high authority, who confirmed his identification of it. He has recently been kind enough to show the egg to me, and I believe it is only an abnormal egg of the Common Whitethroat. Neither Mr.

Coward nor I have ever been able to see or hear the bird in Lleyn. I have also Mr. Coward's authority for saying that the record of Ray's Wagtail is doubtful. He has again referred to his notes, and he finds that he only included the bare name of this species in his list of birds seen at Abersoch in 1887, with no particulars; and that with regard to the Nevin bird in 1895, there is a note of interrogation against the name. In the light of our later investigations, we have therefore decided to strike the name out of the list.

Pennant, in his 'Tours in Wales,' mentions that the Rev. Hugh Davis, of Beaumaris, was witness to "a very uncommon wreck of sea-fowl" in 1776. He saw the beach near Criccieth for miles together covered with dead birds, especially those kinds which annually visit the rocks in summer, such as Puffins, Razor-bills, Guillemots, and Kittiwakes; of the last there were many thousands. Other birds mentioned were Tarrocks [the Kittiwake in immature dress], Gannets, Wild Geese, Barnacles, Brent Geese, Scoters, and Tufted Ducks. The frost from Jan. 6th until Feb. 2nd in that winter had been very severe. In October, 1884, I saw thousands of Scoters off the Merioneth coast.

I do not think that Lleyn, as an ornithological district, should be considered to extend further east than about the mouth of the Afon Dwyfawr on the south, and perhaps the headland called Trwyn y Tâl on the north coast. Further east the country becomes more luxuriant and wooded on the south towards Criccieth, and more mountainous on the north. And at Trema-doc I have met with birds, such as the Blackcap and Pied Flycatcher, which belong to the avifauna of Eastern Carnarvon and Merioneth, but not to that of Lleyn, so far as I know. I have often wondered that the Sheld-drake does not breed among the sand-hills between Llanbedrog Head and Penrhyn Du, but I have never seen it there. It may, however, turn up between Criccieth and Pwllheli. At and near Portmadoc I have seen pairs in the middle of May.

NOTES AND QUERIES.

MAMMALIA.

The Food of the Water-Vole.—I am convinced as to the carnivorous habit of the Water-Vole (*Arvicola amphibius*), having on two or three occasions seen the animal industriously engaged in the occupation. I like the little fellow, and have found him right merry company when loafing at eventide in the solitary places of our rivers and broadlands. He is amusing by his frolicsomeness when he seems assured there are no onlookers, and I should not like a hair of his coat harmed by what I may say of him, for such animal food as he may discuss is comparatively worthless. In the August of 1896 I threw a couple of dead Roach on a “rond” in Kendall Dyke, near Hickling Broad, at the rear of my houseboat. Next morning but a few bones and scales remained. Suspecting the Voles, I pegged down another Roach or two, and the Water-Voles—for such they were—came again and had their supper. The late Sir E. Newton had suggested to me some time previously that the number of broken fresh-water Mussel-shells (*Anodonta cygnea*), at Lound, were the work of Voles. On Sept. 12th, 1896, I examined a number of broken shells at Lound, amongst which lay the excrement of the animals in question. One particular valve was always broken, probably being the easier of manipulation. I actually observed a Vole (I was quietly fishing at the moment opposite him) come out of the water, and drag a Swan Mussel up the bank, which he had secured intact. I received a communication shortly after from West Norfolk, pointing out to me the partiality of *Arvicola* to the Crayfish. Above all, however, I think the Water-Vole delights to feed upon the stems of the succulent grasses growing in shallow ditches, and will remain in the centre of a clump, selecting the finest, which, sitting at ease upon his haunches, he nibbles, holding them between his fore paws with all the adroitness of the Squirrel.—A. PATTERSON (Ibis House, Great Yarmouth).

AVES.

Late Redstart and Tree-Pipit, &c.—On Nov. 16th, 1901, whilst walking between Bexhill and St. Leonards, I saw a female Common Redstart (*Ruticilla phoenicurus*) on a fence by the South Coast Railway.

I watched it for several minutes. This is unusually late for this species here. Also, on Nov. 8th, I saw a Tree-Pipit (*Anthus trivialis*) near Fairlight, Hastings. Numbers of Ring-Ouzels (*Turdus torquatus*) arrived here during the latter part of September and October, the last I saw being on Oct. 30th.—MICHAEL J. NICOLL (10, Charles Road, St. Leonards).

Differences between immature Blue-headed and Yellow Wagtails. In reference to Mr. Arnold's note on the above subject (*ante*, p. 24), I do not think that there is any way to tell with certainty the young of *M. flava* from *M. raii*. In really typical examples of the former the throat is almost pure white, whilst that part of the latter is buff or buffish yellow; but there are always intermediate specimens having the throat whitish buff, so that it is very difficult to distinguish *M. flava* from *M. raii*. To my mind, the colour of the head and back have nothing to do with it during the first autumn. The eye-stripe varies as much as the throat. — MICHAEL J. NICOLL (10, Charles Road, St. Leonards).

Little Owl and Shore-Lark in Lincolnshire.—I have just seen a specimen of the Little Owl (*Athene noctua*), which is in the hands of Mr. Nash, a birdstuffer in this city. Mr. Nash informs me that the bird (a female) was shot at Coleby, a village a few miles from Lincoln, about Jan. 10th of the present year. As I have noticed one or two records of the occurrence of this species recently in England, it is possible there may have been a small arrival of immigrants; but I think it more likely that the example in question had either escaped from confinement, or had intentionally been liberated. On Jan. 9th last I saw three Shore-Larks (*Otocorys alpestris*) on the coast at Saltfleet. The birds were remarkably tame, and allowed me to approach within a few yards of them.—F. L. BLATHWAYT (Lincoln).

Gadwall in Merionethshire.—The Gadwall (*Anas strepera*) is such a rare bird in North Wales that the following instances of its occurrence seem worth placing on record. On Dec. 14th last a female Gadwall was shot at flight-time by A. Ephraim, the Ynysfor huntsman, on the marsh there, and was shown to me in the flesh. My friend Mr. E. B. Jones, of Ynysfor, informs me that he himself shot a fine male near the same place on Dec. 30th, 1890, during the severe frost then prevailing.—G. H. CATON HAIGH.

Notes from Shetland.—GREAT NORTHERN DIVER (*Colymbus glacialis*). A few have been seen at intervals. One was recently shot in Yell; its stomach was said to contain 147 fish!

Coot (*Fulica atra*).—One seen on Nov. 2nd, and one on Dec. 24th last; both on Cliff Loch. A third was caught on Whalsey Island on Dec. 3rd.

LONG-EARED OWL (*Asio otus*).—I have only seen one this winter; it was a male, brought to me alive from Burrafirth on Nov. 3rd. I set it at liberty.

RED-BREASTED MEGANSER (*Mergus serrator*).—A good many have been seen round the coast.

SCAUP-DUCK (*Fuligula marila*).—Two were shot on the west side of this island on Nov. 18th.

WIGEON (*Mareca penelope*).—Have been fairly plentiful.

WOODCOCK (*Scolopax rusticula*).—Three seen—two on Dec. 18th, 1901—at Haroldswick, and one on Jan. 8th at Burrafirth.

Snowy Owl (*Nyctea scandiaca*).—One reported from Yell on Jan. 24th. This bird is becoming exceedingly rare. During all my wandering during the past four years I have only been fortunate enough to come across one, and have heard of no others, nor have any traces been seen.

ICELAND GULL (*Larus leucopterus*).—Two were seen on Jan. 27th at Baltasound.

WAXWING (*Ampelis garrulus*).—A specimen—a female in fair condition—was shown to me by a young lad, Robert Moust; he caught the bird alive at Baltasound on Dec. 25th, and tried ineffectually to keep it alive.

RED-NECKED GREBE (*Podiceps griseigena*).—One was shot at Baltasound on Dec. 30th.

The experiment has again been tried of introducing Grouse into Shetland, some six hundred birds having been let loose on the Mainland last September. They have not yet strayed so far north as this island, and I question very much if they will increase to any extent; want of cover, damp, Ravens, and human enemies will not give them much chance.—T. EDMONDSTON SAXBY (Baltasound, Shetland).

REPTILIA.

Sand-Lizards at St. Leonards-on-Sea.—In the spring and early summer of 1892 I captured several Lizards of both species, i.e. *Lacerta vivipara* and *L. agilis*, on some brickfields close to West St. Leonards Railway Station, and kept them alive for some weeks, though I did not know until the summer of 1901 that there was any interest attached to the Sand-Lizard in this district. I am perfectly convinced of their identity by their much larger size and green sides, and, on looking at

some specimens of both species at the Natural History Museum, South Kensington, I at once recognized the Sand-Lizard as similar to the ones I obtained.—MICHAEL J. NICOLL (10, Charles Road, St. Leonards).

PISCES.

The Saw-fish (*Pristis antiquorum*) in British Waters.—In the notice of my “Notes and Letters of Sir Thomas Browne” (*ante*, p. 79), the writer, after quoting the statement by Browne that a “sword fish or Xiphias or Gladius” was taken “intangled in the Herring nets at yarmouth,” adds on my authority that this “appears to be the only authentic record of this southern species in British waters,” which is far from being the case. The note in which the above statement occurs does not refer to this species, but to the Saw-fish (*Pristis antiquorum*), respecting which Browne writes:—“A pristes or serra saw-fish taken about Lynne comonly mistaken for a sword-fish and answers the figure in Rondeletius” (*Notes*, p. 36); then follows the account of the Sword-fish in a separate paragraph. In my footnote to *Pristis antiquorum* I say that, “so far as I am aware, Browne’s is the only record of the occurrence of this southern species in British waters, with the exception of a note in Fleming’s ‘British Animals’ (p. 164), where it is stated, on the authority of the late Dr. Walker’s MS. ‘Adversaria’ for 1769, that *Pristis antiquorum* “is found sometimes in Loch Long”; but Fleming adds that he has “met with no other proof of its ever having visited the British shores.” Any further information with regard to this species as a British fish would be gladly received.—THOMAS SOUTHWELL (Norwich).

[Mr. Southwell is quite justified in his correction, “Sword-fish” having accidentally been substituted for “Saw-fish” in the notice referred to. However, although the Sword-fish is undoubtedly sometimes taken in British waters, it still seems doubtful whether Browne’s record of the Saw-fish will be generally accepted. Mr. Boulenger—with whom I recently discussed the question—certainly did not believe the fish had ever reached our shores.—ED.]

NOTICES OF NEW BOOKS.

The Home Life of Wild Birds: a New Method of the Study and Photography of Birds. By FRANCIS HOBART HERRICK. G. P. Putnam's Sons, The Knickerbocker Press.

THIS book is another evidence of the advance made in ornithological bionomics by the aid of Photography. It also inculcates a new method of "control," not by making a captive of the bird or nest, but by the displacement of the latter from its original position to one that affords a better field for observation. "If the nest like that of an Oriole is fastened to the leafy branch of a tree, the nesting bough is cut off, and the whole is then carefully lowered to the ground and set up in a good light, so that the branch with the nest shall occupy the same relative positions which they did before. The nest, however, is now but four instead of forty or more feet from the ground." Other nests are treated on the same principle and brought within the vicinity of a green tent, "which effectually conceals the student, together with his camera and entire outfit." In fact, when the arrangements are successfully completed, the author and his camera are frequently not beyond an actual distance of about two feet from the nest. This transaction has produced a number of charming illustrations, and, what is more, these have portrayed many novel attitudes in bird life. The young Belted Kingfishers and their habit of walking backwards is a case in point, and for the probable origin of that procedure we must refer to the book itself. In the chapter on "The Force of Habit" are several singular records. In watching hour by hour the American Robins visiting their young, Mr. Herrick found that the male invariably came to the right side of the nest, while the female did not pursue that strange predilection. In "Taming Wild Birds without a Cage" the author has described many traits known to all of us who can, now and then, practise that difficult human feat of "keeping quiet." The rest in the woods when tired out has

often shown us more than all our efforts and fatigues in search of bionomical observation, and this fact has been clearly recognized and made use of by our author. Why is it that in zoology the best and most patient observations are often made by ornithologists ?

Atlas of Practical Elementary Zootomy : being a Revised Edition of the Zoological Portion of the Atlas of Practical Elementary Biology. By G. B. HOWES, LL.D., F.R.S. Macmillan & Co.

MOST of us will call to mind the laconic answer given by Huxley to a controversialist of biological aspirations, "Take a cockroach and dissect it," and if we only studied animals by themselves first, and read the books afterwards, there can be little doubt of the vast advantage to our biological knowledge. To-day we too often only see what the books tell us to observe, while the books themselves are not unfrequently built up on other writings. Prof. Howes leaves no doubt as to his meaning. "Lecturing, which is mere recapitulation, in advance of facts to be later learnt by work in the laboratory, is useless, if not mischievous." This book is a guide to the Huxleyean "Type System," and the late Prof. Huxley, writing a preface to its first edition in 1885, observed : "No doubt the direct instruction of a teacher is very valuable ; but with the aid of this Atlas, I think that an intelligent student, who is unable to obtain that advantage, will find no difficulty in working through 'The Course of Practical Instruction in Elementary Biology' by himself."

Twenty-four plates are given, detailing the anatomy and physiological organs of Frog, Crayfish, Earthworm, Snail, Fresh-water Mussel, Fresh-water Polyp, and some Unicellular organisms. The student who, with these easily acquired animals, these plates, a very moderate dissecting apparatus, and a pair of fairly intelligent eyes, does not find a key to the mysteries of animal life must have mistaken his vocation.

Bird Hunting on the White Nile. By HARRY F. WITHERBY. The Office of 'Knowledge.'

MR. WITHERBY has great opportunities, and, as an ornithologist, he certainly tries to make the best of them. He has

visited the Bustards on the plains near the Guadalquivir, tried Russian Lapland, has just started on a Persian expedition, and in this small volume gives the principal incidents of a journey made "to add to our knowledge of the birds and beasts of the Soudan."

These pages have the merit of giving a very fair impression of the neighbourhood of the ancient river, with its modern railway, its sandy plains, its few trees, and apparently its limited bird fauna. To have reached this hunting-ground would have a few years ago been considered the work of a "traveller"; it will soon be only the starting-point for a journey to British possessions farther south, where the solitude of the green veld will be exchanged for the silence of the sandy desert. The author's greatest success appears to have been the acquisition of a rare and beautiful Goatsucker (*Caprimulgus eximius*), of which we read that up to that time only four specimens were known, but of which since that date the Rothschild and Wollaston party have discovered a spot where it is fairly common, and procured no fewer than some fifteen examples. A list of the birds collected and observed is appended, and also one of the mammals contributed by Mr. de Winton.

The Vertebrate Fauna of Bedfordshire: Birds. By J. STEELE-ELLIOTT. Printed for private circulation.

IN our volume for 1897 (p. 486) we drew attention to the commencement of this excellent publication, as much a contribution of good work as of private enterprise in the cause of ornithology. We have now received the conclusion of the "Birds," with an intimation from the author that he does not intend publishing the memoirs of the other vertebrates, as he is doing that work for the Victorian History of the County. We hope, however, that in a few years Mr. Steele-Elliott will return to his self-imposed task, and give us the complete description of the fauna which he has so well begun. At all events, his present instalment affords a history of the birds of Bedfordshire.

EDITORIAL GLEANINGS.

At the meeting of the Zoological Society, on the 4th inst., Dr. H. Lyster Jameson, M.A., read a paper "On the Origin of Pearls." The author's observations referred especially to *Mytilus edulis*, the Common Mussel. The pearls were found to be due to the presence of parasitic Distomid larvæ, which entered the subcutaneous tissues of the Mussel, and became surrounded with an epidermal sack similar in its characters to the outer shell-secreting epithelium of the mantle. If the *Distoma* died in the sack it became calcified, and formed the nucleus of a pearl, the pearl arising, like the shell itself, from the calcification of the cuticle of the epithelial cells. The parasite sometimes migrated out of the sack, in which case the nucleus of the pearl was inconspicuous. Dr. Jameson had investigated the life-history of this parasite, and found that it arose as a tail-less Cercarian larva, in sporocysts, in *Tapes decussatus* and *Cardium edule*. He had succeeded in infecting Mussels from *Tapes* in an aquarium. The adult stage of this parasite was apparently *Distoma somatinæ*, Levinseñ, which occurs in the intestine of the Eider-Duck, and which the author had found in the Scoter or Black Duck (*Ædemia nigra*). The complicated life-history of the parasite, and the absence of organs of locomotion in the Cercaria-stage, sufficed to account for the anomalous and hitherto inexplicable distribution of pearl-bearing Mussels. Dr. Jameson had found that pearls were caused by similar parasites in several other species of Mollusca, including some of the Pearl-Oysters; and he believed that the artificial infection of the Pearl-Oysters could be effected in a similar manner to that which he had found successful in the case of the Common Mussel. When this was achieved the problem of artificially producing pearls would be solved.

SLOWLY but steadily the great collection of British Birds by Mr. F. Coburn, the well-known taxidermist, of Birmingham, is being built up. More than ten years have elapsed since the work was first entrusted to him by Mr. Baylis, of Birmingham, and it may be fifteen or even twenty years before the great task is completed. The statement suggests *dilettante* efforts, but, as a matter of fact, hard constant

work has been given to the undertaking, and an enormous amount still remains to be done. The root idea is to prepare a collection of every species of British bird. This in itself does not appear a very formidable task, since there are only about 415 different kinds. But it is stipulated also that each bird should be presented at every stage of its existence, from the egg to the adult male and female, and, moreover, should be placed in a scene resembling its natural habitat. This means, of course, that the number of different birds which have to be collected and stuffed amounts not to hundreds but to thousands, and with no two alike. Take, for example, the Yellowhammer. In the first place, Mr. Coburn found a Yellowhammer's nest in a wild rose tree. Then, with incredible patience, he set to work, and patiently reproduced that scene in a case about five feet by three feet, with a depth of two feet six inches. The branches, twigs, and leaves of the tree were all faithfully imitated, and, as twenty-three gross of leaves were required, and each had to go through eleven distinct processes, the task was almost comparable with that of Sisyphus. But when that was finished, the real work had only begun. Just as the would-be cook is instructed first to catch his hare, so Mr. Coburn had to provide himself with Yellowhammers in every stage of development. Moreover, the adults vary considerably, so representatives of different types were included. Altogether, fifty specimens were necessary. Then each bird had to be stuffed—and in a collection on the lines indicated this is a matter requiring the most exact knowledge, as well as careful workmanship. Finally came the arrangement of the birds in the case. One nest containing eggs was fixed in the bush. As Yellowhammers build also on the ground, another nest was placed there, containing young. A bird just out of the nest, with its beak open to receive food from a parent close by, was the next object of attention. Then on the twigs of the bush were displayed the remaining birds in their different stages, and also the adults in characteristic attitudes. When, ultimately, the case was completed, Mr. Coburn had the satisfaction of knowing that he had disposed of one species.

At the present time forty species have been completed, and material has been collected for more than 250 of the remainder. For some birds—such as the Great Northern Diver—three separate cases are needed, and for the Heron there are two cases, each five feet wide and four feet six inches high. Of course, when the collection is completed it will be absolutely unique. It is declared that it will take absolutely the first place in the British ornithological world, easily surpassing the most famous collections of to-day. Certainly a very large hall—comparable in size with the Birmingham Town Hall—will be

required in which to display the cases, and from the museum thus formed the life-history of every British bird can be deduced more readily than from acres of printed matter. At present large photographs of the cases are being taken, and probably, when about one hundred are available, they will be published in book form. In view of the magnitude of the task before him, Mr. Coburn sometimes speaks despairingly of the prospect of completing it. But it is to be hoped that more rapid progress will become possible in the future.—*Birmingham Daily Mail.*

ALAS ! poor Heron. We extract the following paragraph from a weekly contemporary :—“The Heron does not seem to be a popular bird with proprietors of Trout streams. One gentleman has the following recipe for getting rid of the luckless feathered fisherman : ‘Bait a night-line with a Trout threaded from head to tail with a long needle, leaving the points of the hooks outside the corners of the Trout’s mouth. Attach the bait to a night-line, pegged down securely, and put the lure into the water on the shallow where the Heron comes to feed. If the line is properly leaded to keep the bait in position, you will have your Heron to a dead certainty, and can lead him home like a dog on a chain next morning.’” We commend this information to the Society whom it most concerns.

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THE ZOOLOGIST

No. 730.—April, 1902.

Migration of Birds in N.E. Lincolnshire during the Autumn of 1901.

By G. H. CATON HAIGH.

THERE have been few seasons during recent years in which the meteorological conditions have been so uniformly favourable for the passage of birds on their southward migration as those prevailing throughout the past autumn, and although for this reason no great "rush" of migration took place, the steady inflow of birds was almost uninterrupted from the middle of August to the end of November.

The whole autumn was unusually fine and dry, the only heavy rainfall occurring on Nov. 12th and 13th.

During the latter half of August light variable winds prevailed, with fine weather. From Aug. 31st to Sept. 3rd the wind was N.E., and from this date to the end of September light easterly to south-easterly winds prevailed with little intermission. Throughout October the wind was again very variable, but usually light, with fine weather. November was a somewhat similar month, except for a gale and heavy rain on the 12th and 13th, followed by a spell of sharp frost to the 18th.

As in 1900, no rare birds appeared, the only unusual occurrences being those of the Firecrest, Roller, Great Snipe, and Red-necked Phalarope.

The waders were again very scarce, as they have been in all recent years. Possibly the great increase in the number of

men with guns who annually visit the Lincolnshire coast from the manufacturing districts is gradually causing the shore-birds to forsake the Humber flats as a resting-place on their autumn passage.

Turdus viscivorus, Linn. Mistle-Thrush.—These birds were extremely numerous in the vicinity of the coast during the autumn. Large flocks appeared on Sept. 21st, and many between the 28th and Oct. 8th. They were again abundant from Nov. 5th to 9th, and on 20th several appeared in the hedges near the sea with Song-Thrushes.

T. musicus, Linn. Song-Thrush.—A heavy and long-continued migration of this species took place, commencing at the unusually early date of Sept. 2nd, when a few birds appeared on the coast. The chief movement, however, took place from Sept. 25th to Oct. 17th. Between Nov. 5th and 9th another passage occurred, accompanying the other species of *Turdidae*. Lastly, on Nov. 19th and 20th Thrushes were again abundant in all covert near the coast.

T. iliacus, Linn. Redwing.—A very insignificant passage, a few appearing on the coast on Nov. 1st and 5th, and a good many on the 9th. Redwings were less numerous than usual throughout the autumn.

T. pilaris, Linn. Fieldfare.—I saw a small flock of Fieldfares at Well Vale, near Alford, on Oct. 31st, and a single bird on the coast on the following day. On Nov. 5th, 6th, and 9th Fieldfares were very abundant.

T. merula, Linn. Blackbird.—Less numerous on the coast than in any recent year. The first, consisting mostly of young cocks, came in on Oct. 2nd. They were again numerous on 21st. On Nov. 5th there was a considerable flight, the majority being old cocks, with a few young birds of both sexes. Again, on the 9th, a further flight, almost all old males.

T. torquatus, Linn. Ring-Ouzel.—I shot a young bird at North Cotes on Oct. 3rd. One was again seen near the same place on 22nd, and another on 25th.

Saxicola œnanthe (Linn.). Wheatear.—A good many appeared on Aug. 23rd, most of them perching freely on hedges near the sea-bank. On Sept. 4th, 5th, and 6th they were extremely

abundant near the coast, and a few remained until the 23rd. On Oct. 2nd I shot an example of a large form which often appears in October, and on the 3rd and 4th I saw single birds, probably of the same form.

Pratincola rubetra (Linn.). Whinchat.—Very scarce. I only saw three single birds all the autumn, on Sept. 5th, 6th, and 30th.

Ruticilla phoenicurus (Linn.). Redstart.—Many Redstarts appeared in the coast hedges on Sept. 5th, with various other small birds. On the following day they were less numerous, and then entirely disappeared until the 23rd, when a considerable immigration took place. On 25th the Redstarts had left again, and I only saw about half a dozen, and from this date until 30th I saw two or three each day.

Erithacus rubecula (Linn.). Redbreast.—Robins appeared on the coast on Sept. 20th, and were present in varying, though never in great, numbers until the end of the month. There was no visible migration throughout October, but they were again present in small numbers on the 5th, 9th, and 20th of November.

Sylvia cinerea (Bechst.). Whitethroat.—Considerable numbers of Whitethroats appeared in the coast hedges as early as Aug. 23rd. They were again abundant on the 3rd and 5th of September, and still more so on the 14th, but on 20th only a single individual remained. On the 24th I noticed a few in turnip-fields inland at Grainsby and Fenby, and, lastly, two on the coast at North Cotes on the 28th.

S. curruca (Linn.). Lesser Whitethroat.—Only occurred twice on the coast at North Cotes—the first on Sept. 5th, and the second on 28th.

S. atricapilla (Linn.). Blackcap.—I shot a single old cock Blackcap in a hedge at North Cotes on Sept. 28th.

S. hortensis (Bechst.). Garden-Warbler.—Among the many small birds which came in on Sept. 25th were two Garden Warblers, and on the following day I met with a single bird.

Regulus cristatus, K. L. Koch. Goldcrest.—As in last autumn, the Goldcrest was almost entirely absent on the coast. A single bird appeared on Sept. 27th, a second on Oct. 2nd, and a third on Nov. 5th.

R. ignicapillus (Brehm). Firecrest.—I shot an example of this pretty species at North Cotes on Nov. 9th. It was in a tall

old thorn hedge, and I noticed that it kept to the topmost branches instead of to the middle or bottom of the hedge, as a Goldcrest would have done.

Phylloscopus rufus (Bechst.). Chiffchaff.—This usually scarce migrant appeared in somewhat large numbers. I obtained a single bird on Sept. 25th, while on the 27th they were quite numerous in the hedges near the sea-bank at North Cotes. On Sept. 30th I only saw one, and another on Oct. 3rd.

P. trochilus (Linn.). Willow-Warbler.—The passage of this species lasted from the middle of August to the end of September. I first saw it on Aug. 16th, and from that date until Sept. 26th it was always present in the coast hedges in greater or less numbers, though at no time very abundant.

P. sibilatrix (Bechst.). Wood-Warbler.—On Sept. 3rd I saw a Warbler in a hedge at North Cotes which I have no doubt belonged to this species, but it was very shy, and I failed to secure it.

Acrocephalus phragmitis (Bechst.). Sedge-Warbler.—I saw two Sedge-Warbblers in a reed-bed close to the sea-bank at Tetney on the somewhat late date of Sept. 26th.

Accentor modularis (Linn.). Hedge-Sparrow.—The passage of the Hedge-Sparrow lasted from the middle of August to nearly the middle of November, but, curiously enough, it was almost absent throughout October. It first appeared on Aug. 16th, and was numerous on 23rd, was again abundant on Sept. 5th and 30th, and, lastly, a slight movement took place on Nov. 5th to 9th.

Parus major, Linn. Great Titmouse.—A few Great Tits appeared in the coast hedges on Sept. 5th and 6th; one each day on Oct. 3rd and 4th; a good many on 22nd, and a single bird on Nov. 29th.

P. britannicus, Sharpe & Dress. Coal-Titmouse.—I saw three of these Tits in a hedge near the sea-bank at Tetney on Sept. 26th, and obtained one of them. On Oct. 3rd I secured a couple in a hedge near the coast at North Cotes. All appeared to belong to the British form.

P. cæruleus, Linn. Blue Titmouse.—Abundant on the coast all through the autumn. The first bird appeared on Aug. 23rd, and it was scarcely ever absent up to the end of November, being particularly numerous on Sept. 21st and Oct. 3rd and 22nd.

Troglodytes parvulus, Koch. Wren.—Not at all numerous, but a few appeared in the coast hedges on Sept. 25th, 28th, and 30th.

Motacilla lugubris, Temm. Pied Wagtail.—A good many young birds in the vicinity of the coast on Aug. 16th. Numerous on Sept. 20th, the majority being young birds. Again abundant on Oct. 2nd, these being mostly adults.

M. melanope, Pall. Grey Wagtail.—I saw the first on Oct. 4th, and several appeared during the first half of November.

M. raii (Bonap.). Yellow Wagtail.—A good many young birds near the coast on Aug. 16th. From Sept. 2nd to 5th a few each day, all immature. Two or three young birds in potatoes at North Cotes on Sept. 23rd.

Anthus pratensis (Linn.). Meadow-Pipit.—This bird was numerous along the coast all through September, though not so abundant as usual. I noticed two coming in over the sea in the daytime on Sept. 27th at Saltfleet.

A. obscurus (Lath.). Rock-Pipit.—A few Rock-Pipits about North Cotes Sluice on Sept. 26th. Numerous all along the coast on Oct. 3rd.

Muscicapa atricapilla, Linn. Pied Flycatcher.—The first Pied Flycatcher appeared on Sept. 4th. They were numerous in the coast hedges on 5th and 6th, a few were seen on the 14th and 23rd, and the last bird was observed on 25th.

M. grisola, Linn. Spotted Flycatcher.—Very abundant at Grainsby on Aug. 29th. On Sept. 4th I noticed two of these birds in hedges near the sea. Last seen at Grainsby on Sept. 23rd. It is somewhat unusual to meet with this Flycatcher on the coast.

Hirundo rustica, Linn. Swallow.—The majority of the Swallows left during the third week of October. The last that I saw were a pair on the 19th.

Coccothraustes vulgaris, Pall. Hawfinch.—Apparently scarcer than usual; I only noticed three in Grainsby Healing covert on Nov. 30th.

Carduelis spinus (Linn.). Siskin.—I shot a Siskin among some reeds near the coast at Tetney on Sept. 23rd, and the same day saw a pair in a hedge near the sea-bank at Marshchapel.

Passer domesticus (Linn.). House-Sparrow.—On Sept. 23rd

very large flocks of Sparrows appeared in the hedges and stubbles near the sea, and on Oct. 21st swarms of these birds were present in the same situations.

P. montanus (Linn.). Tree-Sparrow.—I saw a few Tree-Sparrows in a hedge at Grainsby on Oct. 1st. On Nov. 9th I noticed several among the flocks of House-Sparrows in the vicinity of the coast.

Fringilla cælebs, Linn. Chaffinch.—Chaffinches were very abundant on the coast on Oct. 21st, and as usual all were cocks.

F. montifringilla, Linn. Brambling.—Bramblings were very scarce all through the autumn. I procured a female on Sept. 23rd on a hedge near the sea-bank at Marshchapel.

Linota cannabina (Linn.). Linnet.—Very large flocks on the coast in hedges, stubbles, and "fitties" on Sept. 20th, and still more abundant on 25th.

L. flavirostris (Linn.). Twite.—Two or three Twites arrived on North Cotes "fitties" on Oct. 3rd. I saw a small flock quite a mile inland on 5th, and a large flock appeared on North Cotes "fitties" on 22nd.

Emberiza citrinella, Linn. Yellowhammer.—Very abundant near the coast in hedges and turnip-fields on Oct. 4th and 5th.

E. schæniclus, Linn. Reed-Bunting.—One or two appeared on the coast on Sept. 30th.

Plectrophenax nivalis (Linn.). Snow-Bunting.—Very scarce; a few young birds and one adult appeared on the sea-bank at North Cotes on Nov. 19th.

Sturnus vulgaris, Linn. Starling.—Large flocks in the vicinity of the coast, and others coming in and passing inland to S.W. on Sept. 20th. On 25th a similar migration, but in larger numbers. On Oct. 2nd and 3rd small straggling flocks were passing inland to N.W. all day. The same passage continued on 4th, but the flocks were larger and not so frequent, and some of them were going south.

Corvus monedula, Linn. Jackdaw.—On Oct. 21st I saw a flock of about twenty Jackdaws come in from the sea, flying from E. to W. at a considerable height.

C. corone, Linn. Carrion-Crow.—About half a dozen Carrion Crows near the coast at North Cotes on Sept. 25th. These birds were unusually abundant during the autumn, exceeding the Grey

Crows in number. On Dec. 1st I saw a flock of quite two hundred in a stubble-field outside Autby Wood—a favourite roosting-place.

C. cornix, Linn. Grey Crow.—A few appeared on Oct. 5th. I noticed a good many inland on the wolds on 15th, mostly flying west.

C. frugilegus, Linn. Rook.—Numerous on grass-land in the vicinity of the coast on Oct. 2nd. On 22nd single Rooks were coming in and going W. at short intervals, until one o'clock; almost all appeared to be old birds. On 25th they were still coming in in straggling flocks from E. to W. until two o'clock, both old and young birds travelling together. On Nov. 29th a similar migration took place, the flocks moving in the same direction until two o'clock. As far as I could see the last consisted entirely of young birds.

Alauda arvensis, Linn. Sky-Lark.—Very little visible migration, but the species was present in its usual numbers during the winter. On Oct. 3rd small parties were going N.W. all day. On the 4th a few flocks going N.W., and a smaller number going S. On 22nd large flocks coming in from the sea from E. to W., and on Dec. 1st a few passing S.W. over Grainsby.

Cypselus apus (Linn.). Swift.—Last Swifts seen on Aug. 23rd. The majority left before the middle of the month.

Dendrocopos major (Linn.). Pied Woodpecker.—Fairly numerous in the winter. I saw the first at Grainsby on Oct. 3rd. One was said to have been killed on the Tetney sea-bank on Nov. 16th, and on 26th I saw two recently killed young birds at a Grimsby birdstuffer's.

Alcedo ispida, Linn. Kingfisher.—First seen on Saltfleet Haven on Sept. 6th; a second at North Cotes sluice on 25th, and several along the sea-bank on Oct. 4th.

Coracias garrulus, Linn. Roller.—In the 'Field' of Oct. 5th Mr. L. D. Marsden notes the appearance of a Roller, which was seen at Brackenborough, near Louth, on Aug. 29th, and again on Sept. 26th.

Cuculus canorus, Linn. Cuckoo.—Fairly numerous at Grainsby during the last week of August. Last seen near Scarthoe on Sept. 9th.

Strix flammea, Linn. White Owl.—A single Barn-Owl in a small plantation near the coast at Tetney on Oct. 9th.

Asio otus (Linn.). Long-eared Owl.—A small Owl, probably of this species, near the coast at Tetney on the evening of Sept. 25th.

A. accipitrinus (Pall.). Short-eared Owl.—I flushed two Short-eared Owls from among the thistles on the sea-bank at Tetney and North Cotes on Nov. 20th.

Buteo vulgaris, Leach. Common Buzzard.—A Buzzard was seen near the sea-bank at North Cotes on Oct. 22nd.

Accipiter nisus (Linn.). Sparrow-Hawk.—A few along the sea-bank on Sept. 5th and 6th. Numerous in the vicinity of the coast at the end of September, and all through the first week of October, and two or three in the coast hedges on Oct. 22nd.

Falco peregrinus, Tunst. Peregrine Falcon.—A large Hawk, probably of this species, on the sands off Grainthorpe Haven on Sept. 27th.

F. æsalon, Tunst. Merlin.—First seen on Oct. 5th; one came in from the sea, and passed inland to W. A second at Somercotes on Nov. 1st.

F. tinnunculus, Linn. Kestrel.—Several Kestrels along the coast on Sept. 5th. Very numerous on 20th and 21st, and again a few on Oct. 22nd.

Sula bassana (Linn.). Gannet.—A single young bird on the sea off Donna Nook on Sept. 27th.

Ardea cinerea, Linn. Heron.—Young birds abundant on the coast on the drains and "fitties" on Aug. 23rd.

Anser brachyrhynchus, Baill. Pink-footed Goose.—First seen on Oct. 15th, a flock of between thirty and forty going W. over Grainsby. It was, however, reported that a flock of one hundred was seen at Tetney Lock on 11th. From this date to the first week of November many flocks of Grey Geese were seen both inland and on the coast.

Cygnus musicus, Bechst. Whooper.—Three large Swans were seen on Oct. 1st on North Cotes "fitties."

Tadorna cornuta (S. G. Gmel.). Sheld-Duck.—A flock of about twenty Sheld-Ducks—all apparently young birds—on North Cotes sands on Sept. 5th, and a few in the same place on 20th.

Anas boscas, Linn. Mallard.—Several large flocks of Wild Ducks appeared on the sea off Saltfleet on Sept. 27th. During

the northerly gale and heavy rain of Nov. 12th and 13th great numbers of Ducks were reported as seen in the Humber and on the coast.

Nettion crecca (Linn.). Teal.—Teal were scarce in the early part of the season, but I saw a flock of a dozen on Aug. 28th. They were rather more numerous during the second half of October.

Mareca penelope (Linn.). Wigeon.—Somewhat scarce and late in appearing. I shot the first on Sept. 25th, but saw very few until October.

OEdemia nigra (Linn.). Scoter.—A flock of about a hundred on the sea off Donna Nook on Sept. 3rd.

Columba palumbus, Linn. Wood-Pigeon.—On Oct. 28th and 29th flocks of forty to fifty going S. at intervals. From Nov. 8th to 15th they were numerous all over the district, but the majority disappeared shortly after the latter date. I was told that an immense flock passed over Thoresby about Nov. 20th.

Turtur communis, Selby. Turtle-Dove.—Was very abundant up to the end of August, but almost all had left by the end of the first week of September.

Crex pratensis, Bechst. Corn-Crake.—Last seen at North Cotes on Sept. 2nd.

Rallus aquaticus, Linn. Water-Rail.—A few on fresh-water “crikes” near the coast on Oct. 21st and 22nd.

Charadrius pluvialis, Linn. Golden Plover.—A few at North Cotes on Sept. 3rd; another small flock on 30th. On Oct. 5th I saw a flock of about fifty come in from the sea, going S.; but the main body did not arrive until Nov. 19th.

Squatarola helvetica (Linn.).—Grey Plover.—Two or three Grey Plovers on North Cotes Sands on Sept. 26th, and a few more at Tetney and North Cotes on 28th, but the species was unusually scarce all the autumn.

Vanellus vulgaris, Bechst. Lapwing.—The first travelling flocks seen on Sept. 25th. On 26th small flocks coming in from the sea, and going W., until three o'clock; a few which I shot were young birds. Oct. 3rd, a few flocks going N.W. at a great height. On Nov. 17th, during sharp frost, straggling flocks of Lapwings were passing over Grainsby to W. until about two o'clock, and on 19th they were very abundant on fields near the

coast, with Golden Plovers. Lastly, on Nov. 30th an immense flight passed over Grainsby to W.; it extended as far as I could see in each direction, and must have contained several thousands of birds, but was divided into separate parties of from one to two hundred each.

Hæmatopus ostralegus, Linn. Sea-pie.—A large flock near the mouth of Grainthorpe Haven on Sept. 20th.

Phalaropus hyperboreus (Linn.). Red-necked Phalarope.—One was brought to me by a Plover-catcher on Sept. 3rd, which he had just killed on his decoy-pool near Tetney Lock.

Scolopax rusticula, Linn. Woodcock.—Apparently a poor Woodcock season everywhere. Three were seen at Well, near Alford, on Oct. 30th, and two shot on the following day. The main flight, however, does not appear to have arrived until the third week of November. Two were killed on the Mablethorpe sand-hills on 23rd of that month, and I saw a good many in the coverts about Grainsby on 27th.

Gallinago major (Gmel.). Great Snipe.—On Sept. 6th I shot a Great Snipe from a small patch of potatoes near the sea-bank at North Cotes. When first flushed it only flew about ten yards, and dropped in the same potato-patch.

G. coelestis (Frenz.). Snipe.—Many Snipe on Tetney "fitties," and in "crikes" near the coast on Oct. 2nd and 4th; but very wild for new-comers. On 7th I noticed a few Snipe coming in from the sea, and going W., and I flushed several in potato-fields near the coast.

C. gallinula (Linn.). Jack Snipe.—I shot the first Jack Snipe at Tetney on Sept. 20th, and a second on 26th. A great immigration took place on Oct. 21st, when I killed eight and a half couples of these birds in a patch of reeds known as Madam's Crike, situated close to the sea at Tetney.

Tringa alpina, Linn. Dunlin.—A few on the coast on Aug. 16th, but far less than usual at this season. Some large flocks appeared all along the coast on Sept. 27th. On Nov. 18th, with a heavy N. gale, a flock of two to three hundred Sandpipers, probably of this species, passed over Waith Fen (five miles inland), going W., and flying close to the ground.

T. subarquata (Güld.). Curlew-Sandpiper.—I shot a young bird of this species out of a flock of six on Marshchapel sands on Sept. 20th.

T. canutus, Linn. Knot.—A few small flocks of Knots appeared on North Cotes sands on Sept. 26th, and some very large flocks on Nov. 5th.

Calidris arenaria (Linn.). Sanderling.—Very scarce; only saw four—two adults and two young—between Saltfleet and Grainthorpe on Sept. 3rd. On 27th I noticed a few small flocks containing both old and young birds in the same locality.

Machetes pugnax (Linn.). Ruff.—Saw a single Ruff on Grainthorpe "fitties" on Sept. 6th.

Totanus hypoleucus (Linn.). Common Sandpiper.—I found these birds abundant in all the marsh-drains near the coast on my arrival in Lincolnshire in the middle of August, and a few remained in the district until Sept. 28th.

T. ochropus (Linn.). Green Sandpiper.—As in the case of the last species, the Green Sandpiper was abundant by the middle of August. It had become scarce by Sept. 22nd, and I last saw it on Nov. 3rd.

T. calidris (Linn.). Redshank.—Very large flocks on Grainthorpe "fitties" on Sept. 3rd.

T. fuscus (Linn.). Spotted Redshank.—I saw two of these birds in a "crike" in a field near the coast at North Cotes on Aug. 16th, and again at the same place on 28th, with a party of five Greenshanks. One was caught by a Plover-catcher at Tetney on Sept. 23rd.

T. canescens (Gmel.). Greenshank.—Several Greenshanks on Tetney "fitties" on Aug. 23rd, and a great many both at Tetney and North Cotes on 28th.

Limosa lapponica (Linn.). Bar-tailed Godwit.—A flock of about a dozen Godwits on Grainthorpe "fitties" on Sept. 3rd.

Numenius arquata (Linn.). Curlew.—Curlews were passing S. over Grainsby in great numbers on the night of Aug. 14th. Some large flocks appeared on the coast on 28th, and the species was abundant through the autumn and winter.

N. phaeopus (Linn.). Whimbrel.—This usually abundant species was almost entirely absent. I saw a few on Aug. 16th, only one on 28th, and all were gone before the middle of September.

Sterna macrura, Naum. Arctic Tern.—Very scarce; I saw two on Sept. 6th near Grainthorpe Haven. On 27th a few small

flocks of Terns off Donna Nook. Almost all appeared to belong to this species, but possibly there were a few Common Terns among them.

Larus argentatus, Gmel. Herring-Gull.—On Aug. 31st flocks of Herring-Gulls in V-formation were passing S. all day over Grainsby. They were flying at a great height, and calling incessantly. On Sept. 1st they were still passing, but in smaller numbers. On Sept. 3rd I noticed that Herring-Gulls were very scarce on the coast, but the Great Black-backed Gulls were present by thousands, quite nine out of ten being adult birds.

Megalestris catarrhactes (Linn.). Great Skua.—On Sept. 21st I saw a very large dark-coloured Skua off Donna Nook, which probably belonged to this species.

Stercorarius pomatorhinus (Temm.). Pomatorhine Skua.—A beautiful adult bird of this species was shot in a drain near the coast at Tetney by one of the Plover-catchers on Sept. 4th.

S. crepidatus (Gmel.). Arctic Skua.—I saw the first of these birds on Sept. 3rd. On 6th there was an adult of the white-breasted form, and, lastly, a single bird on 27th.

Podiceps fluviatilis (Tunst.). Little Grebe.—First appeared on the coast on Sept. 25th at North Cotes, a single bird in full summer plumage. It was rather numerous during the winter on the brooks and marsh-drains.

AN OBSERVATIONAL DIARY OF THE HABITS—
MOSTLY DOMESTIC—OF THE GREAT CRESTED
GREBE (*PODICIPES CRISTATUS*), AND OF THE
PEEWIT (*VANELLUS VULGARIS*), WITH SOME
GENERAL REMARKS.

BY EDMUND SELOUS.

(Concluded from vol. v. p. 462.)

COMING, now, to my observations on the Peewit (which have, as I suppose, a bearing upon the foregoing remarks), I will premise by saying that anyone who watches these birds during the early spring will see them going through some curious actions on the ground, which I term “rolling,” for want of a better word. A bird thus acting presses its breast into the soil, and, by moving from side to side, or turning upon it a little as on a pivot, makes a round cup of just such a nature as—lined with grass or lichen—the eggs, when found, are seen to repose in. Of this fact, and also that many such cups are made by the same bird—who is, in fact, always thus acting—keepers, or some of them, are aware. Whether anybody else is, I do not know, but I have never in any ornithological work, learned or popular, met with any kind of reference to this habit, which may yet, as I believe, throw light upon the origin of nest-building. What is this rolling? What is its essential character and meaning? I can only quote from my notes which were taken at the time, and so, at least, give a minute, and, I trust, accurate description of what I actually saw.

March 8th.—A Peewit rolling, his breast on the ground, his tail up and moving from side to side in a manner suggestive of the generative organs being in activity. But neither this nor the actual roll is so pronounced as I have seen it. Having acted thus for a short while, he rises and runs forward in a series of very short little precise steps, which have a peculiar character about them. His whole pose and attitude is, also, peculiar.

The head and beak are pointed straight forward in one line with the neck, which is stretched straight out to its fullest extent, the crest lying flat down upon it. Evidently he is under the sway of some special feeling, which is, as evidently, of a sexual character. In this strange, set attitude, and with these funny little set, formal steps, he advances without a pause for some twenty or thirty yards, then stops, and, without leaning forward on his breast, elevates the tail, waggles it strongly from side to side with the same peculiar action as before, and then flies off.

Another—or it may be the same—bird is now acting in a similar manner, though there are some points of difference. Although his breast is inclined forward, he does not roll, but, standing thus, keeps constantly moving the tail up and down with the same motion—carrying with it the same suggestion—as before; whilst at intervals he turns on his feet, where he stands, round, or nearly round. These actions are certainly sexual, and seem intended to be more than mere nuptial antics. They suggest—and still more is this the case where the bird rolls on the ground with motions of the anal parts precisely similar to those which may be observed whilst pairing is actually taking place—an attempt (conscious or unconscious) to satisfy sexual desire other than by the ordinary channel.

March 9th.—A Peewit rolling on the warrens between 12.30 and 1 p.m. This bird seems to be quite alone. I cannot, with the glasses, see any others either on the land or flying.

March 14th.—A Peewit rolling. The tail and anal parts are moved—wriggled—in an unmistakable manner, which suggests—and only suggests—the actual act of pairing. Another bird is near during this, but does not seem interested in the rolling one, and the latter soon flies away without paying it any attention. Yet it is to be remarked that the under tail-coverts of the Peewit (just that part exposed during the rolling) are of a rich bright chestnut, which becomes, then, very conspicuous.

March 21st.—Have just watched a Peewit rolling in a very conspicuous manner. It was a full back view, and, as the tail was flung up and twisted from side to side, the rich chestnut under tail-coverts were very conspicuous indeed. The wings were, also, a little quivered, being at the same time drooped and

somewhat extended from the sides. During this display, or whatever it may be called, I noticed another Peewit on the ground, and advancing towards the one rolling, with a very intent look. It soon appeared, however, that the intentness was only in regard to getting food. The bird, though approaching the other (by chance, I now think),* was merely feeding, and, when fairly near, turned deliberately round, and seemed to take no more notice.

March 25th.—A Peewit is now rolling very pronouncedly, and a strange performance it is. The whole body seems lifted up, so that the bird, though sitting, is resting only on his breast, the rest of him being in the air. The breast is thus pressed into the sand, whilst a rolling or side to side movement of it, varying in force, and by no means always apparent, helps to make a cup-shaped hollow. This curious, raised attitude alternates with a more ordinary sitting posture. After each raising of the wings and tail they are depressed, again raised, and so on, whilst at intervals there is the curious waggle of the tail, as before described, suggesting actual copulation. Another Peewit is near, and, whilst this proceeds, comes nearer and nearer, this time, I think, really actuated by an interest in the performance. As it gets closer the other seems to become more excited. The advancing Peewit stops when only a foot or two off, and seems again indifferent, and the rolling one flies right up from his rolling attitude, without even first rising out of it—as far as I can see. He scuds away, and soon begins to sweep and throw in the air. Another Peewit that I now see rolling rises and makes a long and uninterrupted run, with the funny little mincing steps and curious attitudes once before described, right up to the immediate proximity of three Stock-Doves, and, at hardly a yard off one of them, begins to roll again. The Stock-Doves take no notice, as far as can be judged by appearances, and the Peewit, ceasing suddenly with a little start, as though he recognized his error, flies away.

March 29th.—A Peewit rolling. Another appears close amidst the grass, and comes up to it with the funny little step and head held straight out in a line with the body. As it gets up the rolling bird rises and goes a step or two farther off, then,

* Subsequent entries, however, make this conclusion of no value.

again, throwing itself forward, stands almost perpendicularly on the breast, at the same time pecking at and, I think, seizing the bits of grass near, in the beak (this pecking during the process of rolling has become, lately, more marked). The other Peewit now comes right up to the rolling bird, and appears to examine its lower tail-coverts or the parts adjacent. I cannot say certainly whether it actually touches them with the bill, but it appears to do so.* Upon this the rolling one flies off, and the other, falling forward, presses with the breast (I think also pecking), not in exactly the same place, but just near it. Two other birds are now rolling in a most marked and violent manner, within a few yards of each other. When I say "marked and violent," what I mean is this: The breast is pressed upon the grass, the whole body inclining sharply up from it. The wings project like two horns on each side of the tail, which is bent down between them in a nervous, virile manner. All at once a spasm or wave of energy seems to pass through the bird; the tail is bent still more forcibly down—the body and wings remaining as before—and, with some most energetic waggles from side to side, the generative act appears to be performed. It may not be so; it may be something essentially different, but it has exactly that appearance.

In speaking, henceforth, of a bird's rolling, I shall always intend to designate these actions—except, of course, to the extent to which I may qualify them.

April 2nd.—Two Peewits have just paired. I had noticed no prior antics. Having paired, one of them—I am not quick enough with the glasses to say which—runs a little way over the ground, and commences to roll. In a moment or two the other one runs up, looking most interested, and immediately sits along on the exact spot, the first one having now risen and standing aside. The last-come bird now rises also, and both stand looking at the place where they have just rolled, and making little pecks at it with their bills. Subsequently one of them does this beside—but not quite on—the spot. Then the last comer walks a little away, so that I lose sight of it; whilst the other one, on

* I have lately seen something resembling this, but very much more marked and peculiar, in a pair of our small *passeres*—a strange affair of which I made a full note.

which I keep the glasses, rolls again, in the same place (though turned the other way) in the most marked manner. Then, rising, he runs forward in the direction from which he has come, in the curious way before noted, the head lowered to line of back, and beak pointing straight forward.

In a little while the same thing occurs again, but again I am not quick enough with the glasses to be quite certain which bird it is that leads the way in these performances, immediately after the pairing. In each instance, however, I think it was the male. He now rolls in two different places, continuing, after the first time, to run on further in the same direction, before again stopping and rolling. It is only now, on this second occasion, that the other one runs up to him. The actions of the two are then as before, except that the last comer—the female, as I think—rolls this time, slightly, also. It is in a very imperfect and, as one may say, rudimentary manner, but I catch the characteristic, though subdued motion with the tail.

My glass was now upon a Peewit standing negligently on the warrens, when another one, entering its field, flew right down upon it, and either paired, or attempted to do so, without previously alighting on the ground. The time occupied was so short that I should not have supposed more than an attempt had taken place, had not the actions of the two birds immediately afterwards made me conclude that they had paired. They were almost precisely the same as on the first occasion, but I saw them more clearly from the commencement. Immediately after the pairing the male bird made his curious little run forward by the side of the female and a little beyond her, the characteristic features of it being somewhat emphasized.* He then made a short pause, but almost immediately continued straight on—a long run, at the end of which he pitched forward and commenced to roll. The female shortly came up to him in the same manner as on the other occasions, and the male bird now, moving his length forward and sinking down again, she sat in the spot where he had just rolled, pecking, as before described, whilst he rolled again just in front of her. The two birds then rose and stood, looking and pecking in the way that I have before noted. After

* By referring back to p. 134 it will be seen that the actions after (1) rolling, and (2) copulation, which rolling so much resembles, are identical.

a little the hen ran (or walked) away, leaving the cock, who rolled a little more before leaving the place.

In the above notes I have laid more stress upon the peculiar movements which precede and accompany the rolling of the bird than upon the actual rolling itself, by which I have named the whole performance. It must be remembered, however, that I watched it through powerful glasses, by which means all the actions become plainly visible, and take their proper proportion. But to the ordinary casual spectator it is different. He is at some distance; he has only his own eyes, and he is quite uninterested. Under these circumstances it is the general features that alone strike him, or, to speak more correctly, are at last by sheer necessity forced upon his observation. The main features, here, are that the bird sits for some time together with its breast pressed into the sand, augmenting the pressure by various more or less pronounced movements of the body, and that many little cup-shaped depressions, but a small proportion of which ever have eggs laid in them, are to be found about over the warrens and other such Peewit-haunted parts that are open and loose-soiled, during the early spring-time. All the rest—the curious little run forward with its strange, set attitude, the peculiar motions of the tail, everything minute and intricate—is unremarked, even though it be actually seen. As for the actual pairing of the birds, with the curious little drama between them which follows, this must be patiently watched for in the early and often bitterly cold morning—that, at least, is the only time that one can be tolerably sure of its taking place.

In none of the above instances did I walk to examine the places where the birds had rolled, after they had left them. They would, indeed, have been difficult to find; but upon another occasion, when the circumstances made this easy, I did so, and found, as I say, just such a little round basin in the sand as the eggs are laid in. No eggs, however, were ever laid here,* whilst the bird was afterwards to be seen rolling in other parts. It is easy, under such circumstances, to keep one Peewit, or, at least, one pair of them, distinct from others,

* They would, of course, only be laid in one such depression, which would then become the nest proper.

for they appropriate a little territory to themselves, into which they will return and stand, however much they may fly abroad. And here the birds return, in my experience, spring-time after spring-time, so that I judge them to pair for life.

Now I submit that these curious actions of the Peewit during the breeding-time do support that theory of the origin of nest-building which I have here roughly sketched—if not entirely, at least to a certain extent. They point in that direction. Here we have movements on the part of both the sexes, which are obviously of a sexual nature, and, as to which the word “ecstatic” seems hardly to be misapplied. They are most marked (and only or most generally then dualistic) immediately after the actual pairing, and just where this has taken place they commence in the curious little run and set attitude of the male. Out of and as a result of these movements, a depression in the ground greatly resembling, if not quite similar to, that in which the eggs are laid is evolved, and into or about this is shown a tendency to collect sticks, grass, or other loose substances. How different are these collecting movements to those which we see in a bird whose nest-building instinct has become more highly developed! They seem to be but just emerging from the region of blind forces, to be only half purposive, not yet fully guided by a distinct idea of doing something for some definite end. Yet it is just these actions which most resemble ones which seem so purposive in the ordinary building of a nest. All the others seem to me to belong to that large and important group of avine movement which may be called the sexually ecstatic or love-mad group. It may, indeed, be said that, as the Peewit could not have devised a more effective way of producing a cup-shaped hollow in the ground for its eggs than by rolling or pressing upon it as it does, therefore the intention of producing it is to be deduced from the act itself, and we have no right to read any other motive force into it than this. But (besides that this view bows out instinct) the motion by which such hollow is produced cannot at all be separated from that most pronounced, peculiar, and, as it seems to me, purely sexual one of the tail, or, rather, of the anal parts, and there is, moreover, the very marked and peculiar run with the set, rigid attitude (that salient feature of a bird's nuptial

antics) which immediately precedes the rolling, and which, also, cannot properly be separated from it. All this set of actions must be looked upon as so many parts of one and the same whole thing, and to explain such whole thing we must call in some cause which will equally account for all its parts. The deliberate intention of making a nest will not do this, for many of the actions noted do not in the least further such a plan. On the other hand, sexual excitation may just as well produce rolling on the ground (as indeed it does in some other birds*), and perhaps, even, pecking round about on it, as it may the set, stiff run, and those other peculiar movements. And if some of many movements, the cause of all of which is sexual, should be of such a nature that out of them good might accrue to the species, why should not natural selection seize hold upon, increase, and gradually shape them, making them, at last (through the individual memory), intelligent and purposive, since, by becoming so, their utility might be largely increased, and proceed at a much quicker rate? I believe that in these actions of the Peewit—commencing immediately after the excitation of pairing, with a peculiar run (which, or something similar to which, may be observed in various birds), and going on, without pause or break, to other motions having the same plain sexual stamp upon them, though some may, in their effects, be serviceable—we see this process actually at work, and I believe, also, that in the nest-building of species comparatively advanced in the art we may still see traces of its early sexual or ecstatic origin. I have been, for instance, extremely struck with the movements of a hen Blackbird upon the nest that she was in course of constructing. I have not my notes at hand, but these movements appeared to me to partake largely of an ecstatic—one might almost say a beatific—nature, so that there was a large margin of energy over and above the actual business of building, to be accounted for. I was not in the least expecting to see this, and I can, perhaps, best estimate the extent of the thing by recalling how it surprised and struck me. The wings were half-spread out, and would, I think, have drooped,† had not the edge of the nest supported them, and I particularly

* Most notably in the Ostrich.

† The drooping of the half-spread wings is very characteristic of sexual excitement in birds.

noted the spasmodic manner in which the tail was from time to time suddenly bent down. It is true that it then tightly clasped—as one may almost call it—the edge of the nest, pressing hard against it on the outer side. But though such action may now have become part of a shaping process, yet it was impossible for me, when I saw it, not to think of the Peewit, in which something markedly similar could have answered no purpose of this kind. Were the latter bird instead of rolling on the ground to do so in a properly constructed nest of a size suitable to its own bulk, the tail, upon being bent forcibly down in the way I have mentioned, would compress the rim of it just as does that of the Blackbird. And were the Blackbird to go through the motions which I witnessed, on the bare ground and side by side with the Peewit, a curious parallel would, I think, be exhibited. To these two I may add the Rook, and—from recent observation—the Australian or Black Swan. Similarity of the cup of many built nests to the cup-shaped hollow in which so many ground-laying birds deposit their eggs, is, indeed, a significant thing, and the significance is increased when we see the same or very similar movements employed in the shaping of both.

In the case of these Peewits it is true that the pairing, when I saw it, did not take place on the same spot where the rolling afterwards did. Nevertheless, the distance was not great, and it varied considerably. The run which preceded the rolling commenced immediately on the consummation of the nuptial rite, and if this run, which varied in length, were to become shorter and ultimately to be eliminated altogether, the bird would then be pairing, rolling, and, at last, as seems to me highly probable, laying its eggs in one and the same place. That these strange activities should succeed, and not precede, the actual pairing is indeed a curious thing; but I suggest that the rolling of a single bird differs only, in its essential character, from actual pairing, by the fact of its being single, and that, thus, the primary sexual instinct contains, and gives birth to, the secondary nest-making one. At any rate, in the Peewit, movements of a highly curious nature immediately succeed, and seem, thus, to be related to, the act of pairing, and whilst these movements, as a whole, bear a peculiar stamp (expressed by the term “sexual”), some of them, not separable from the *tout ensemble*, suggest, also, the making of a

nest, and, moreover, as said before, something much resembling a Peewit's nest is by such movements actually made. Taking all this together, we have here, as it seems to me, an indication of some such origin of nest-building as that which I have imagined.

As this theory supposes some relation between the nest and the place where pairing takes place—that the one in fact gradually becomes the other—it would be interesting to ascertain whether birds that make their nests in a place which is out of character with their ordinary habits, pair here or amidst their more usual surroundings. For instance, if the Nightjar, a most aërial and arboreal species, were nevertheless to pair habitually upon the ground, this would be a somewhat striking fact. I cannot affirm that it does so. Nevertheless, it is my impression that upon one occasion—which I have recorded in a former paper—I but just missed seeing the pairing of two that I was watching upon the ground and in the near vicinity of the nest. Since then I have seen one pursue another in an obviously amorous or "nuptial" flight from the top of a tree to the ground where it (the pursued bird) settled. The nocturnal habits of this species are, however, a great difficulty in the way of observations of this kind.

The male Wheatear indulges, during the breeding season, in very extraordinary movements of a more or less frenzied nature, and, in watching these, one cannot but be struck by the predilection which seems shown for some natural hollow in the ground, within or over which such movements take place. I have given elsewhere* a full account of these actions as exhibited by two rival birds for the greater part of an afternoon, and I will only quote here a few lines which give that incident of the bits of grass which I have already alluded to. I have, it is true, suggested a symbolical explanation, but, however that may be—nor does, perhaps, the one supposition preclude the other—I think what I witnessed shows that a bird may seize something and bring it to a certain spot whilst in a state of violent nervous excitement, and when the intention of building a nest seems pretty well excluded as a cause of such action.† If this be so, then, at least, some part of the difficulty which we might feel in supposing a process now become so elaborate, and (in some cases

* In my recent work, 'Bird Watching,' chapter iv.

† Compare, also, what I have quoted in regard to the Ostrich.

perhaps) intelligent, to have originated in nervous and non-purposive movements, is removed. My note, taken on the spot and at the time of occurrence, is as follows:—

“Instead of fighting, however, which both the champions seem to be chary of, one of them again runs into a hollow—this time a very shallow one—and begins to dance, but in a manner slightly different. He now hardly rises from the ground, over which he seems more to spin in a strange sort of way, than to fly—to buzz, as it were—in a confined area and with a tendency to go round and round. Having done this a little, he runs quickly from the hollow, plucks a few little bits of grass, returns with them into it, drops them there, comes out again, hops about as before, flies up into the air, descends and again dances about.”

Now here a bird brings to a certain spot, not unlike such a one as the nest is usually built in—approaching to it, at any rate—some of the actual material of which that nest is composed, and I ask if, under the circumstances, it can possibly be supposed that such bird really is building its nest when it does so, in the ordinary purpose-implying sense of the term. As well suppose—so it seems to me—that a man, in the pauses of a fierce sword-and-dagger fight with a rival suitor, should set seriously to work house-hunting or furniture-collecting. Such peckings and pluckings seem to me to partake of the general frenzied character of the bird’s whole actions. Yet when once the object had been seized, associations might be aroused by it.

Supposing the habit of nest-building to have originated in the way here suggested, it need not surprise us that natural selection, seizing hold of such a prime opportunity, should have entirely altered its original character, so that, now, such pairing on the nest as does take place may be looked upon as a survival of a past state of things. In one particular group of birds—the Bower-Birds of Australia—such survival may have been more than usually pertinacious, and there—on the principle of specialization being always an advantage—the thalamum, or pairing-place, may have become, gradually, quite distinct from the true nest. The habit of building more than one nest* would (as I suggest)

* Common (as I believe) to many birds, and due to the mere force of the instinct. Building, I am convinced, is a pleasure—not a labour—to the bird.

have aided in such differentiation and that the pairing-place should ultimately expand into a "bower" would be a result brought about by the high and gradually increasing æsthetic faculties of the birds constructing it. One can understand, too, that as the thalamus passed into a bower, and as the bower became more and more elaborate and complicated, its original purpose might be gradually obscured, superseded, and more or less lost sight of. Such, indeed, has been the case with our own houses and gardens, which in the manifold wants, tastes, and pleasures that they now minister to, have become something very different to their rude originals—beginning with the mere cave—amongst primitive savages. There has, too, been the process of differentiation as between the bedroom and sitting-room or bower. What was the original cave but a sleeping place?

I believe that the key to the unlocking of many of the wonder-chambers of bird doings is to be sought in the highly nervous and excitable organization which birds, as a class, possess, and, especially, in the extraordinary development of this during the breeding and rearing time. This nervous sexual or parental excitation produces all sorts of extravagant motions and antics which are at first quite useless, but on the raw material of which both natural and sexual selection have seized and are constantly seizing. By these two powers they have been or are being directed into various useful channels, such as nest-building, ruses to decoy enemies from the young, displays of plumage by one sex to the other, and so forth. On this view the fact of many bird (or other) antics not being attributable to sexual selection should not be used (as it has been used) to throw discredit on that hypothesis. By what agency the raw material has been shaped in any one case is a question of the evidence in and relating to such case. And as the exercise of intelligence in all these matters would be an advantage, intelligence, as I believe, has, by the same means, through memory, been gradually worked and woven into them, giving to some or all species a special intelligence in some special directions, which, though much above the general level of its capacity, yet reacts upon this and tends to raise it. I believe, too, that, if closely watched, many actions of birds which seem now to be altogether intelligent and purposive (and, no doubt, are so to a very large extent) will be found to betray traces of a nervous and non-purposive origin.

ON MR. SELOUS' THEORY OF THE ORIGIN OF
NESTS.

By H. E. HOWARD, F.Z.S.

In his article on the Great Crested Grebe in this Journal (1901, p. 339), Mr. Selous made reference to "one of two rival Wheatears catching up a piece of grass in the midst of violently excited movements," adding that he would recur to the explanation of this habit. I therefore looked forward with much interest to his explanation of a habit which I admit had puzzled me for some years, and which, taking his observations in conjunction with my own, I now feel sure is probably—if we only knew it—to be found amongst the majority of species. I therefore think it best to put my own observations on record, as they appear to me to very much strengthen the foundation on which his theory of the origin of nests is built—a theory which, to my mind, now that I look back upon the same, to me, unintelligible sexual movements which I have from time to time observed, appears to be placed outside the category of a provisional hypothesis.

In an article on the Grasshopper-Warbler (Zool. 1901, p. 61), I described the male of this species picking up a dead leaf, and following the female with it in his bill, while mating. But this only very tamely describes what really happens, and if it had not been for Mr. Selous I should still have been satisfied with the conclusion I then arrived at, *viz.* that it was an outward sign of the one absorbing picture in the bird's mind—the construction of its nest. Sexual frenzy precisely describes the condition of the males of the above species at this time—that is to say, during the week or so they are mating—and in every case where I have closely followed their movements at this period, they have performed the same curious ceremony, usually in the midst of intensely excited and nervous actions. These movements are characterized, as a rule, in the following way: The male walks—you might almost say struts—along in front of the female,

picks up a leaf, again walks on for a little, drops it, and disappears with quick darting flight after another—probably rival—male. Presently he returns, crawls to the top of a bush, commences to sing, in the middle suddenly breaks off, and again darts off after the other male, then returns and marches on in front of the female, and again picks up and carries a leaf. She meanwhile threads her way in and out of the dead and growing herbage, apparently unconscious to anything that might in any way tend to produce the same nervous tension in her own mind, and oblivious to the sexual selection proceeding around her. In fact, I cannot call to mind a single case where I have seen anything approaching frenzy in the female of any species while mating.

The conclusion I formed after remarking the behaviour of the males at this season was that the picking up and carrying of a leaf was due solely to the fact that, inasmuch as the construction of the nest must be commenced within a few days of the time of my observations, and the bird's mind being full also of this same idea, this action might be *ipso facto* a commencement; but, in the light of later observations, any theory of this kind falls to the ground. The following spring I was attracted by the movements of a Blackcap flying from tree to tree in hurried flight, carrying a piece of one of the dead grasses with which the nest is generally constructed. But herein lies the difference—that it was one of the first Blackcaps that had arrived, and there was no sign of any female; in fact, the females had not arrived. Again, last year, the first Whitethroat arrived in this district—and how well I remember the day—on the 20th April, the first day of that long spell of dry weather. The sun was just rising, and the rays of light coming through a slight mist gave all the trees and foliage that extraordinary glow which those who are accustomed to being out at that time of day will readily understand. Not having seen the bird for six or seven months, I thought I must sit down and watch. The bird was in that state of restless frenzy, at one moment diving into a bramble-bush, then climbing up the topmost sprays, singing all the while intermittently. After one rather longer dive into the bush than usual, he reappeared, carrying a piece of dead grass in his bill, full of excitement, flying from spray to spray, with no apparent object

for so doing. Again, as in the case of the Blackcap, no female was present, the females, as we all know, arriving late.

One more case—this time a Hedge-Sparrow. The male was hopping along a wall in front of the female, carrying a piece of straw, excited, as far as Hedge-Sparrows can be, shuffling his wings and flirting his tail. But, as Mr. Selous aptly remarks, it is the beginning of everything that is fraught with such significance. Is this a non-purposive movement springing out of sexual passion, or is it an outward representation of an idea contained in the bird's mind?

It appears to me that the fact of the male Blackcap and Whitethroat going through this performance before any females had arrived tends to prove that it belongs to the former hypothesis rather than to the latter, and thereby upholds Mr. Selous' theory that this was the origin of the nest. For, watch a Blackcap on his arrival, or any other male before actually having mated, and you will see that his or their movements point to the fact that all the thoughts are concentrated on the one object—the possession of a female—and to attain this object all their powers, chiefly vocal, are directed. Any thought of the construction of a nest—if really there is at all at this period, which I am inclined to doubt—must be in comparison with the other momentous event in the bird's life wholly insignificant. At no time are the vocal powers of the Blackcap shown to such an advantage as when mating; his song then is continuous. When not loud it is a low expressive warbling, and if you will watch him you will see that his whole body is trembling with this nervous excitement. At this time also he puts himself in all kinds of curious contortions. I have seen him carry his tail more than at right angles to his body, which he does at no other period of his life. The same thing may also be said of the Whitethroat, only, in his case, warbling would hardly express his nervous vocal production—it is more of an angry scolding.

Again, the Chiffchaff only floats about the air like a big moth when trying to win a mate. Much the same might be said about the Garden Warbler.

The Marsh-Warbler produces far more vocal variations at this time. The Red-backed Shrike never mimics to such perfection as when mating. I have heard in succession Swallow,

Partridge, and Starling most perfectly imitated. And at what other time does he go through those extraordinary, what one might call, gestures to the female; he does all he can to speak? At times, when he twists his neck round and turns his head upward, he appears to be imploring heaven to help him.

I could mention many similar cases, but these, I think, are sufficient to prove that the whole powers of the bird's body and mind are concentrated solely on the possession of a female. This being so, it appears to me to be highly improbable that this action can in any way refer directly to the construction of the nest.

For a minute let us consider it simply expressive in practical form of a mind overburdened with the mental image of a nest and all that pertains to its construction, and that it is in no way associated with any sexual passion. Assuming this, then, why do we not find the same action in the female? Assuredly to her the nest must mean as much, if not more, than to the male; and if this was only an expression of delight on the part of the male at the return of the breeding season, it is only reasonable to suppose that we should find the same or some similar action in the female. But the fact is clear to my mind that in no case have I found any similar action in the female. I admit my observations are few, and can in no way be thought of as anything in the nature of proof; but, taken in conjunction with Mr. Selous' own observations, I think it will be admitted there is reasonable basis upon which his theory is raised.

NOTES AND QUERIES.

AVES.

Notes on the White-breasted Kingfisher (*Halcyon smyrnensis*).— In 'The Zoologist' for 1901 (p. 451), Mr. E. L. Gill notices the slow sailing flight of certain birds, not normally singing on the wing, when they occasionally do this. I have observed a similar peculiarity in the White-breasted Kingfisher here (Calcutta). This bird occasionally flies about slowly and aimlessly high in the air, uttering a peculiar wailing cry, very different from its usual harsh cackle; though this, too, is given either on the wing, or just before starting on an ordinary flight. I should like also to draw attention to two other peculiarities of this bird. One is, that it occasionally practises piracy. An individual which haunts the Museum pond, whereon there are some Dabchicks, has several times been seen by me to attempt to rob one of these birds of a fish which it had captured, and once, at all events, with success. On one occasion I saw the Kingfisher hovering over something in the water, which turned out to be a Dabchick washing itself; evidently he had for a moment mistaken the actions of his victim, and thought it had caught something. The other point is, that although this Kingfisher is as big as a Thrush, with plumage of brilliant blue, bay, and white, and with a scarlet beak, it is not at all conspicuous when seen across the Museum tank (about sixty yards wide), whether it sits on a bamboo, or on a dark-foliaged tree; indeed, if one's eyes are taken off it, the bird is very hard to find again. Yet in flight, at the same distance, it is a most striking object. This shows that a plumage which appears most glaringly conspicuous close at hand does not necessarily render its wearer easy to see some distance off, if the colours are suitable for blending with the normal environment of the species. If the bird were all bay or white instead of partly blue, it would catch the eye at once.—F. FINN (Indian Museum, Calcutta).

A Little-known Action of the Kingfisher.— While recently fishing on the Bela, my son saw a Kingfisher (*Alcedo ispida*) splashing about on the top of the water in rather a deep pool. Thinking the bird

was in difficulties, he ran forward to rescue it, if possible ; but when he got to the place he saw that there were two birds in the act of treading, the hen being scarcely visible till both rose from the water and flew off. Hitherto I have been under the impression that Kingfishers only entered the water after their prey, leaving it again as soon as they had secured it. I may mention that the river-watcher, who is well versed in the habits of birds, and has been about rivers all his life, has never met with a similar instance.—R. H. RAMSBOTHAM (The Hall, Meole Brace, Shrewsbury).

Golden Eagle in Co. Donegal.—On the 17th or 18th of March I had the pleasure of seeing a fine Golden Eagle (*Aquila chrysaëtus*) at the establishment of Messrs. Sheals, the taxidermists here, where it had been sent for preservation ; it had been caught in a vermin-trap by one of the keepers on Sir James Musgrave's estate in Co. Donegal. Sir James tells me that they protect them as much as possible, although they destroy many Grouse, Hares, and young Lambs. Some time ago he sent a fine specimen to the gardens of the Royal Zoological Society, Dublin, where it was much appreciated, and where, I understand, there were either none or a very poor representative of this species at the time. He also tells me that they breed every year in the mountains round his shooting ; he does not grudge them their share of the game, and I sincerely wish every game-preserved throughout the British Isles would look on the few birds of prey left to us in this light.—W. H. WORKMAN (Lismore, Windsor, Belfast).

I have also examined the Golden Eagle referred to above. It is a male in splendid plumage, weighing $8\frac{3}{4}$ lb., and measures $6\frac{1}{2}$ ft. from tip of wings.—W. C. WRIGHT (Charlevoix, Marlborough Park, Belfast).

Allen's Gallinule near Yarmouth.—I learn from the Duchess of Bedford that a pair of *Porphyriola alleni* were certainly turned out with other birds at Woburn Abbey, but this took place in 1889, and it seems quite impossible that either of this pair can be the example captured on a boat off Yarmouth on Jan. 1st, 1902 (cf. *ante*, p. 98). Even if they had survived so long, they would by that time have been in the adult plumage, which is purple, whereas the Yarmouth specimen is immature.—J. H. GURNEY (Keswick, Norwich).

PISCES.

A Question of Coloration.—On Feb. 8th last, Mr. Alma Nichols, the noted Stalham angler, kindly invited me to go and look at some fish—

several Roach, a couple of Dace, a Gudgeon, and a small Pike—which he had kept for nearly three weeks in a foot-bath standing under the drip of a pump in his back yard. All the wells hereabouts are very shallow, and so, susceptible to the influence of surface-water, which may account for the longevity of these fish in pump-water. But the most curious thing connected with them was this—when they were first put into the bath (an unpainted galvanized one), they were all dark and brightly coloured; in about a week they began to lose colour, and so became much less conspicuous. Here was a supposed case of fish assimilating themselves in tint to their surroundings—an instance of the assumption of protective coloration; for now, as seen from above, they were far less conspicuous than when first put into the whitey-grey zinc bath. I suggested that their loss of colour was due to loss of health caused by the pump-water. A few days later, one of the Roach became blind, and soon afterwards returned to its darker normal colour. It subsequently died. On Feb. 12th I made another inspection, and found a second Roach partly blinded by a black fungoid growth on the eyes, and it also was in process of turning back to its former dark hue. The question arises, does light and exposure, *acting through the eyes only*, tend to bring about a change of colour in fish?—M. C. H. BIRD (Brimstead Rectory, Stalham).

MOLLUSCA.

Duration of Life in *Helix pomatia*.—A few Edible Snails (*Helix pomatia*) have been living here at large for at least seventeen years. The first batch were brought from Normandy, and turned down in the year 1882. Another lot from Surrey was added to the colony in 1884, since which time no more have been introduced. They do not appear to have bred, or, at any rate, I have seen no young ones, with the exception of two broods reared in a greenhouse, and afterwards turned out, and these soon disappeared, perhaps eaten by Thrushes, and Hedgehogs. Yet a few adults have since appeared almost every summer, with a few exceptions, up to the last (1901), when two were seen. They, or at least two or three of them, always keep to the same spot, only a few yards square, and rarely wander any further from their home. I believe that the two or three Snails just mentioned hibernate under a heap of sticks, for it is close to this that they make their appearance in summer. One venerable-looking Snail, easily recognized by its bleached, weather-worn, and damaged shell, is very regular in its annual appearance abroad. I have not seen any of them moving about earlier in the year than May, or later than the

second week in August. If these are the very same individuals brought here in 1882 or 1884, they cannot at the present time be less than eighteen years old, and may be a good deal older, for they were all full-grown, or very nearly so, when first brought here. *H. pomatia* is not, as far as I am aware, indigenous to any part of Suffolk, even on the chalk, and the soil here is by no means of a calcareous nature, but consists of sharp flinty gravel and sand. When full-grown the shell of this species is so thick and strong as to be proof against the hammering process resorted to by the Thrush, and I doubt whether the jaws of the Hedgehog would be able to crack it. Except among insects, it seems to have few enemies. From its large size, *H. pomatia* is well suited to the vivarium, for its ways and doings are so much more easily and conveniently observed than is the case with smaller species. The laying and hatching of the eggs, growth of the young, and the elaborate preparation for the winter made by this Snail by burying itself just beneath the surface of the soil, and constructing a sort of temporary operculum, are all interesting processes to watch.—G. T. ROPE (Blaxhall, Suffolk).

A R A C H N I D A.

Collecting in Australia.—Perhaps the most numerous group of Australian Spiders are the Epeiræ. But, though there are undoubtedly very many species, it is still my opinion that the number tabulated by Herr Koch in his work on Australian Spiders might be greatly reduced. Of course, it is foolish to censure one so immeasurably more conversant in the subject, but I think I am right in saying that specimens which have been bottled some months, and which have travelled all the way to Germany, are rather likely to mislead the describer, and tend to the enumeration of too many species. What is wanted out here is some collector thoroughly acquainted with the subject, who will be able to spend all his time in the study, and so achieve better results. Of course, some good work is being done by the authorities of the Australian Museum, and also by some few private individuals; but these, as a rule, are not able adequately to publish the results of their work. If some institution, such as the South Kensington Museum, or other, were to send a collector to spend some years in Australia, I think it would be found that there is still more to be done than has ever yet been anticipated. Practically speaking, there are no real workers in Australia, and consequently the subject is rather neglected. It is not only to investigate

these matters, but to publish the results, that is necessary. I am sure that any such collector would receive co-operation wherever anyone here could give it, and, if supplied with sufficient funds, would do some really useful work. The Spiders of Australia have scarcely been collected at all, and collections from Cape York and the wild parts of Central Australia could not fail to bring to light many undescribed species and genera.

I can only add that I hope this suggestion will be followed up, and that someone will see fit to follow Herr Koch's lead ; only let him come here and describe from life, instead of from old and faded specimens.—S. H. BURTON BRADLEY (60, Margaret Street, Sydney).

NOTICES OF NEW BOOKS.

The Birds of North and Middle America. By ROBERT RIDGWAY.

Part I. Fam. *Fringillidæ*. Washington: Government Printing Office.

THIS is the first volume of what will be a very large work, and there is little doubt that it will be completed; for American enterprise is to-day beyond any other in zoology, thanks to a fostering government. The faunistic area dealt with is from the Arctic Lands to the Isthmus of Panama, the West Indies, and other Islands of the Caribbean Sea,* and the Galapagos Archipelago. This publication will be considered a fragment in the years to come, when the "Birds of America" will be written—from the Arctic Lands to Patagonia, for that must be the America of the future, if political destinies ever cast a preliminary shadow.

Mr. Ridgway defines ornithology as comprising two distinct studies—*systematic* or *scientific*, and *popular*. The scientific is stated to deal with the structure and classification of birds, their synonymies, and technical descriptions. The "popular" is estimated as treating "of their habits, songs, nesting, and other facts pertaining to their life-histories." Believing science, as long since taught, to be "organized common sense," we should prefer to call both these phases of study scientific ornithology—the one technical, the other bionomical. The systematic problem has been abundantly considered by Mr. Ridgway, and much is advanced that is new. In the *Fringillidæ*, Dr. Sharpe's *Coccothraustinæ*, *Fringillinæ*, and *Emberizinae* are estimated as "so-called subfamilies" and "unnatural groups." From such questions, which must be left to the ultimate decision of the higher criticism, we may at least glance at some others. It is to be regretted that the author recognizes "trinomials" as a "necessary evil," and, as a logical sequence, the Cardinal Grosbeak is referred to as

* Except Trinidad and Tobago.

"*Cardinalis cardinalis cardinalis*." In other points most ornithologists will cordially agree, especially in the remark that "the correction of an author's orthographical errors is a pernicious practice, though much in vogue; 'science is not literature,' neither has it any concern with what an author should have done or meant to do, but only with what he actually did."

The synonymic references to the species are very ample, and have been compiled with much care. The book is essentially a publication that cannot be neglected, and must be consulted by all who study this avian fauna.

Bulletin of the United States Fish Commission. Vol. xix.

Washington: Government Printing Office.

THIS, the last volume received, maintains its scientific value and excellence in illustration. No fewer than twenty contributors are answerable for its contents, and it is, of course, impossible to give a notice of each essay. Capt. R. W. Shufeldt records his "experiments in photography of live fishes," and nine plates attest the success of his efforts, which were made at the aquaria of the U.S. Fish Commission building in Washington. Prof. Mead is the writer of an elaborate paper on "The Natural History of the Star-fish." Among traditions attached to this animal was one relating to their mode of locomotion, as "that of clinging together in great clusters, and rolling along the bottom with the tide." Prof. Mead had seen balls of Star-fish clinging to each other, but upon examination it was found that the "Stars" were all endeavouring to devour some animal held in their midst. For the purpose of testing the ability of Star-fishes to creep over soft surfaces, vaseline was smeared thickly on a vertical glass plate, and on the under side of a horizontal glass plate, and these plates were submerged in an aquarium. Star-fishes measuring two or three inches from tip to tip were observed to travel over both these surfaces with no apparent difficulty. These experiments were made in an economic interest, and to solve the problem of how to prevent the invasion of these animals to the Oyster-beds; Collins, in 1888, having estimated the damage done by them to the beds in the Connecticut waters alone as amounting to

631,500 dollars, although 42,000 bushels of "Stars" were taken from the beds that year.

Mr. Hermon C. Bumpus has contributed an interesting report "On the Movements of certain Lobsters liberated at Wood's Hole during the summer of 1898." 479 Lobsters were tagged and liberated, and subsequently one was found to have made a record journey of twelve miles in three days. This, however, was in complete contrast to others, though we notice fifteen miles in six days, and the same distance in seven days, among other records. Of the whole number liberated, seventy-six very soon found their way to market, and there is considerable justification for the opinion, "that unless the supply of any one locality is replenished, either by immigration or artificial propagation, the Lobster will be exterminated; indeed, elimination has actually occurred at certain localities, and there is every indication that before long an industry which has yielded many millions of dollars will have perished through the inexcusable abuses of our fishing privileges."

U. S. Commission of Fish and Fisheries. Part xxvi. Report for the Year ending June 30th, 1900. Washington: Government Printing Office.

THIS volume, which has just reached our hands through the accredited channel, may be considered as a recent publication; the title-page is dated 1901. Its contents are a mass of valuable information more available for reference than review. From the report of the Commissioner, we learn that the failure of the "eastern Oyster" to reproduce in the colder waters of Oregon and Washington has suggested the desirability of transplanting to the west coast some of the fine large Oysters found in Northern Japan, notably in Akishi Bay, on the eastern side of Hokushu Island. This idea has passed the stage of suggestion, and negotiations are stated to have been undertaken for the shipment of a cargo.

Mr. H. F. Moore has contributed a report on the "Albatross South Sea Expedition." The full reports on this scientific expedition, under the direction of Mr. Alexander Agassiz, have yet to be published, but the present instalment is somewhat of

an itinerary of the voyage. Mr. Moore, as a naturalist, frequently narrates most interesting observations. Thus, at Tahiti, "a little Kingfisher is always found along the streams and their dry beds, apparently depending more upon insects, which it catches on the wing, than upon the usual food of its kind." At the village of Hihifa, on the island of Tongatabu, there is a remarkable rookery of Fruit-Bats, occupying about fifteen adjoining trees, and estimated to contain upwards of six thousand individuals. Although these animals destroy considerable quantities of fruit, they are "tapu," and under the immediate protection of the chief of Hihifa, and are not permitted to be shot or molested in any manner.

Mr. C. H. Townsend has supplied a "Chronological Bibliography relative to the Work of the Albatross," in which no fewer than some two hundred and forty-four memoirs are enumerated, relating wholly or in part to the results of this voyage; a long list is also given of papers still to be published on the same subject.

EDITORIAL GLEANINGS.

THE Bishop of Carpentaria has contributed to 'Nature Notes' some interesting narrative of a journey through Central Australia. We are told that "one of the great enemies of the overland telegraph line is the common Green Frog (probably *Hyla ewingii*). In order to save the insulators from being broken by the lightning, they are provided with wire 'droppers' leading round them at a little distance to conduct on to the iron pole in case of need. The Frogs climb the poles, and find the insulators cool and pleasant to their bodies, and fancy that the 'dropper' is put there to furnish them with a back seat. After a nap they yawn, and stretch out a leg until it touches the pole—result, sudden death of the Frog ; and, as the body continues to conduct the current to earth, we have a paragraph in the papers to the effect 'that in consequence of an interruption to the lines, probably caused by a cyclonic disturbance in the interior, we are unable to present our readers with the usual cables from England'!"

At the Meeting of the Zoological Society, on March 18th, Dr. H. Gadow, F.R.S., F.Z.S., read a paper "On the Evolution of Horns and Antlers." He stated that three main types could be distinguished in the evolution of the ornamental weapons on the heads of Ruminants, and that all these types were referable to an ancient condition in which the beginning weapon, be it one of offence or defence, appeared as a mere exostosis with a thickened skin-pad. This stage resembled that of *Dinoceras* of the Eocene. Secondly, there was found exostosis of the frontal bone producing a pedicle, surmounted by a cartilaginous mass of apical growth, which by subsequent basal ossification became an antler. Skin originally unaltered and hairy ; this, and the chondrostoma or cartilaginous later osseous growth, was shed periodically, and constituted the Cervine type.

A side issue of Type II. was that of pro-Giraffe-like animals. Cartilaginous growth preponderant, with multiple and broadened bases. Ossification delayed, but still proceeding from the base, e.g. the *Samotherium* of the topmost Miocene. A further development of this type (II.a) was shown by the Giraffe, in which the outgrowth pro-

literated freely and now formed free growths, ossifying independently, of the cranial bones, but ultimately fusing with them.

Type III. was a continuation of the main line from II., represented by the Prongbuck; predominant epidermal growth produced a horn-shoe, which was periodically shed, but had abolished the shedding of the bony core which represented the antler.

Type IV., the highest stage, was represented by the hollow-horned Ruminants, in which the horn-shoe was now a permanent feature; but it was important to note that these animals still shed the first, or earliest, generation of the horny sheath. Horns and antlers were developed alike with a cartilaginous matrix, with subsequent ossification.

These four types were an illustration of onward phyletic evolution, and these stages were still faithfully repeated in the development of the recent species: this was a clear instance where ontogeny was a shortened recapitulation of phylogeny.

With most zoologists we neither affirm nor deny the possible existence of large sea-serpents at present unknown; on this question we are distinctly agnostic. From time to time we are treated in the newspapers with yarns, hasty and mistaken observations, and legends, anent this mythical animal. The following cutting from the 'Pall Mall Gazette' (Sept. 27th last) is worth reproduction for comparison with similar reports, and is given *sans* comment:—

"We have received the following letter from Mr. Oliver G. Ready, of the Chinese Customs. It has reference to a very old friend. Lappa, from which the letter comes, is close to the mouth of the Canton River:—

"Custom House, Lappa, August 22nd.

"SIR,—With the Commissioner's approval, I enclose copy of an official report made by Mr. Officer-in-Charge Wolfe on a monster sea-serpent seen by him when on patrol duty. Mr. Wolfe has been in the Chinese Imperial Maritime Customs service for nine years, and is now in charge of the armed revenue launch 'Lungtsing,' a vessel of one hundred tons and fourteen knots speed. He is most steady and trustworthy, and in every way to be believed. His testimony is, moreover, confirmed in writing by the second officer, and all of the 'Lungtsing's' Chinese crew who were on deck at the time. I have had a long conversation with Mr. Wolfe, and carefully sifted his evidence. You may rest assured that this is not a yarn, but a true and unvarnished account. Chuk Chao Islands are about twenty miles south-west of Hong-Kong, with ten to twelve fathoms of water. There had recently been very

heavy weather in the China Seas.—I am, Sir, yours faithfully, OLIVER G. READY.

“ THE SEA-SERPENT.—On Sunday, Aug. 18th, 1901, at 11.20 a.m., as the Chinese Customs cruising launch ‘Lungtsing’ was steaming at half-speed heading for Boddam Cove, Tungho Island, in lat. N. 22 deg. 8 min. 30 sec. and long. E. 113 deg. 48 min. 40 sec., at about ten cables’ length from the Chuk Chaò Islands, I sighted a dark object on the surface of the water one point on the starboard bow, which looked to me like a rock. I at once gave the order ‘full speed astern,’ and vessel passed about thirty feet clear of the object, which, to my surprise, was a large serpent, lying in a round coil, with its head raised two or three feet, and slightly moving. Stopped engines and lowered starboard gig. I despatched Mr. Kuster, second officer, in gig with orders to kill the monster, if possible. Mr. Kuster stood in bow of gig with a boathook ready to strike. The serpent had now lowered its head again, but on approach of the gig suddenly struck out, hitting blade of one of the oars, turning the sailor turtle-back. It then raised its head to a level of launch’s davit, about 15 ft., at a distance of not more than 10 ft. from the gig and 30 ft. from the launch where I stood. The crew of gig were scared, and prepared to jump overboard. Mr. Kuster, still standing in bow of the gig, prepared to strike with the boathook ; but, before he could do so, the monster suddenly dived and made off. Its action in swimming was like that of an ordinary water-snake ; the water being clear, the reptile could be plainly seen a few feet down. It dived very quickly, and made considerable disturbance of the water.

“ We judged the serpent to be from 40 to 50 ft. long, and about a foot in diameter. It had a kind of crest on its head, and two fins high up on the neck, just behind the jaws. The thickest part of its body appeared to be about 15 ft. from the head, tapering both ways. Its head was as big as a Rugby football, with large eyes, and mouth opened wide when striking. It was of a very dark colour on the back—striped and mottled, but lighter on the belly.

“ As soon as the serpent disappeared, and we on the launch had recovered from our first surprise, I ordered the ten-barrelled Nordenfelt to be loaded, and launch moved round slowly for fifteen or twenty minutes, in hopes that the reptile would reappear; but, not doing so, vessel proceeded on her way to Boddam Cove. (Signed) F. WOLFE, Officer in charge C.L. ‘Lungtsing,’ Aug. 21st, 1901. Witnesses : (Signed) V. KUSTER, Second Officer, and seventeen Chinese.”

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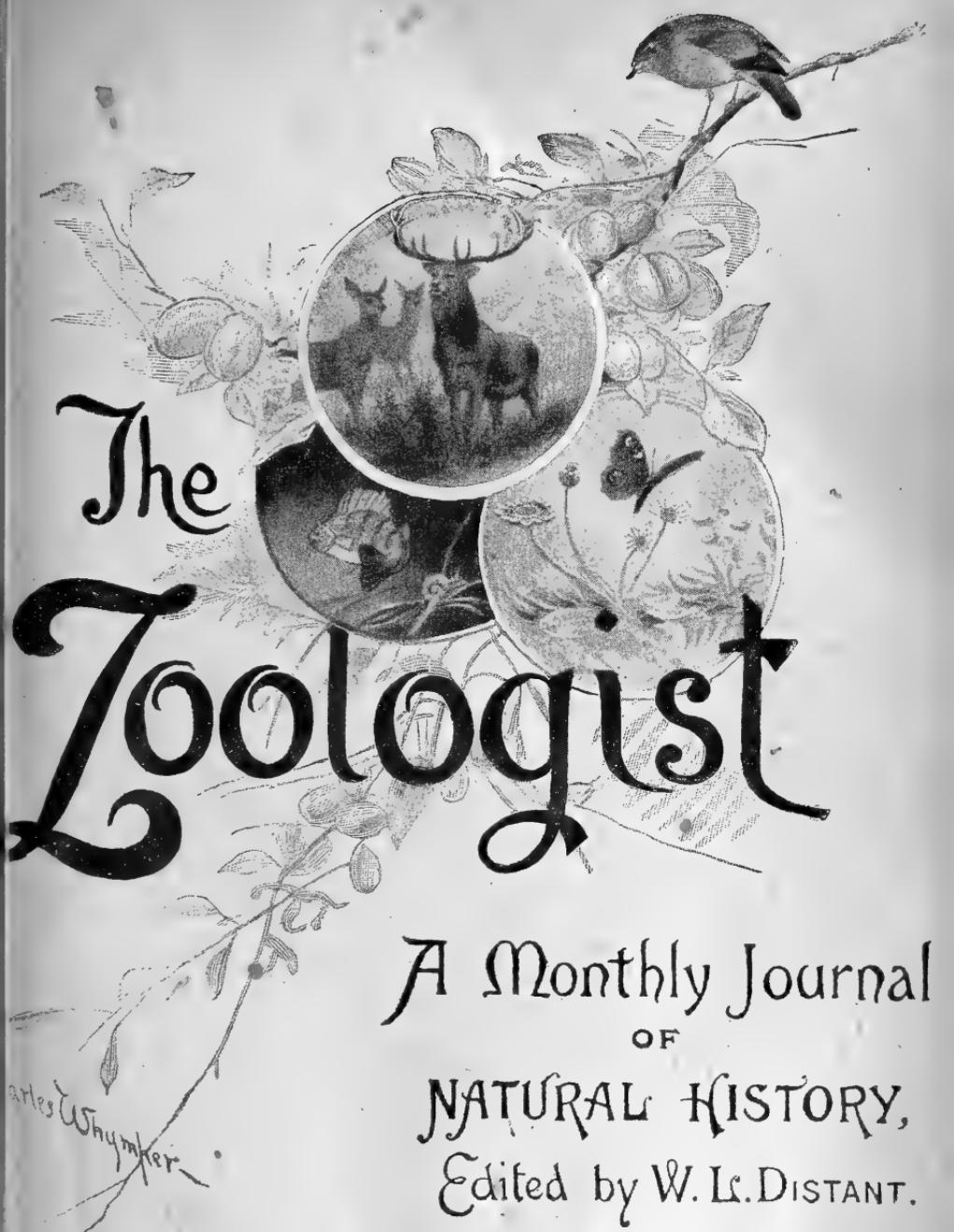
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BIOLOGICAL SUGGESTIONS.

ANIMAL SENSE PERCEPTIONS.

By W. L. DISTANT.

(Continued from vol. v. p. 338.)

WHEN we undertake the consideration of nauseous or offensive smells as means of protection in the animal world, we are able, in some degree, to leave the region of hypothesis which environed us when discussing the question of similarity in sensory impressions in animal vision, and to arrive at negative evidence as to the universality of the sensations of smell. This question becomes most important in estimating the amount of protection afforded to animals by the possession of nauseous or offensive odours. It is unnecessary to recapitulate the many instances already recorded of this protective factor in the struggle for existence. It will suffice to mention, as examples of the phenomena, the immunity from attack possessed by the evil-smelling Skunk (*Mephitis mephitica*) in the Mammalia, and by the *Danainæ*, *Acræinæ*, and *Heliconinæ* among butterflies, in the possession of malodorous juices that can be exuded from the body. It is more than probable that this offensive attribute is much more prevalent than at present recorded: at the same time, to prove its efficacy, it is necessary to also establish some standard of appreciative nastiness in the smell-impressions of the animal world.* Some animals possess a musky odour,

* Mr. Beddard considers:—“Speaking broadly, it is safe to say that the sense of smell is much more highly developed in animals than the sense of sight” (*Animal Coloration*, 2nd edit. p. 177).

which, though distasteful, can scarcely be looked upon as protective. The Giraffe possesses this quality, and Mr. Bryden relates that when following one of these animals, his horse, "hitherto the steadiest shooting pony in the world, had early in the run got wind of the strong musky odour which all Giraffes possess, and bored to the left hand, and I had a good deal of trouble to persuade him to keep straight."* Mr. Thomson suggests that among animals, at least, these odours may serve as incense, or as stimulant—"but perhaps this usefulness is secondary."† An analysis of the evidence, I think, tends to show that the protection thus afforded is partial, and not universal.

Among plants, the Virginian Creeper (*Ampelopsis quinquefolia*), so frequently planted to cover porches, palings, and walls, develops flowers in midsummer which are very industriously and eagerly visited by bees. The colour does not act as an allurement in this case, for the flowers have green corollas, are hidden away under the foliage, and cannot be seen even by good eyes at a little distance. Yet the bees fly thither from all sides in such a way as to leave no doubt that the flowers of the *Ampelopsis* can be perceived by them a considerable way off. "Since it is not their appearance, it must be their smell which announces their presence. But to men they appear to be quite scentless."‡ This clearly goes to prove that the sense of smell is very differently developed in men and bees. The very smell of flowers is subject to variation in response to the nature of the soil. This was demonstrated by Dalibard ("Observations sur le Réséda à fleur odorante").§ He planted mignonette in different soils, using seeds from the same mignonette plant, possessing its well-known fragrance. While the seeds sown in rich garden soil became vigorous, and were well perfumed, the seeds sown in sandy soil produced plants which remained weak and small, and had no perfume. It even seems that the latter did not acquire any odour when transferred to rich garden soil. "Similar facts have since been repeatedly observed and noticed."|| Another

* 'Gun and Camera in Southern Africa,' p. 308.

† 'Study of Animal Life,' 2nd edit. p. 105.

‡ Kerner and Oliver, 'Nat. Hist. Plants,' vol. ii. p. 206.

§ 'Mem. Math. et Phys. Acad. des Sci.' 1750, p. 95.

|| Cf. Varigny, 'Experimental Evolution,' p. 103.

kind of secretion is that of strong scented ethereal oils. Species of *Artemisia* are characteristic plants of the deserts of Africa and Beluchistan; *Pulicaria arabica* has a particularly powerful odour. "Since Dr. Tyndall has shown how minute quantities of such oils diffused through the air are capable of arresting radiant heat, it has been suggested that this is one of the many resources to which desert plants appeal, in order to reduce the ill-effects of the heated atmosphere which surrounds them; and, just as the presence and quantity of opium, hasheesh, aconitine, &c., secreted by plants vary greatly with the climate, so it is reasonable, in the absence of strict investigations, to assume that these oils are in an excess through the intense heat and other conditions of the climate of deserts."* This appears to have been first suggested by Dr. Volkens,† and Mr. Henslow would further apply the suggestion to odoriferous plants growing at high altitudes.‡ These observations or suggestions cannot, of course, have any application beyond the areas mentioned, and, if correct, tend to prove that scents emitted by plants may have other purposes besides those of animal attraction, and again inculcate the necessary caution against concluding that a quality many times observed to have an attractive purpose is necessarily fulfilling that function in all cases. The exhaustive and eloquent summing up of a brilliant judge may excite the admiration of the lounger in court, but does not necessarily have that effect on the litigant whose case it demolishes. Because a plant exhales an offensive odour, it is not less attractive to some insects. In Borneo, Mr. Burbidge found a large amorphophallus bearing fetid flowers; on cutting one of these open he found its basin "half-full of ants of two kinds, and numerous small black coleoptera were running about in the spathe."§

The appreciation of scents and odours by mankind is not of universal similarity, but varied and capable of artificial distortion. The sense of smell is generally considered as more highly developed in savage than in civilized races. Nevertheless, as Darwin has observed, it does not "prevent the Esquimaux

* Henslow, 'The Origin of Plant Structures,' p. 82.

† *Ibid.* p. 116.

‡ *Ibid.*

§ 'The Gardens of the Sun,' p. 233.

from sleeping in the most fetid atmosphere,* nor many savages from eating half-putrid meat.† Many such people who have acquired for generations the habit of eating half-decomposed meat positively enjoy these odours. "What you take for a stink, a Hottentot, if you will believe him, receives as the most agreeable perfume."‡ Even savages differ in this respect, when residing on the same island. The seaboard natives of most of the large islands of the New Hebrides differ in language from the Bushmen of the interior, and look with much disgust on the latter, among whom the family and dogs lived in such dirt, that a native of the coast told Lieut. Somerville that of the Bushman, or "Man-bush," as spoken there, "'e shtink plenty," not leaving the "house," he said, even to answer the calls of nature.§ I well remember, not so many years ago, having, on one of my rambles in the Transvaal, come across a number of Kafir women merrily cutting up a deceased ox on the veld, and I equally remember how I fled to windward of the scene. According to Cameron, the Manyuema not only eat the bodies of animals killed, but also of people who die of disease. "They prepare the corpses by leaving them in running water until they are nearly putrid, and then devour them without any further cooking. They also eat all sorts of carrion, and their odour is very foul and revolting."|| In describing the abode in Borneo of some Malay ladies "of quite the highest aristocracy," Mrs. Pryer states:—"The ground underneath the house (for all houses in this country are built on piles) was in a most horrible and unsanitary condition, being wet with green slime, and all the refuse from the house—fish-scrapings, potato-parings, and everything else—being got rid of through the open flooring above, and had putrified, and created a most evil smell; yet here were these people living above in utter unconcern, just as though deprived of the senses of sight and smell."¶ Even the contents of the

* Cf. Nansen's graphic description of this fact ('First Crossing of Greenland,' new ed. p. 165).

† 'Descent of Man,' 2nd edit. p. 18.

‡ Kolben, 'Cape of Good Hope,' vol. i. p. 231.

§ 'Journ. Anthropol. Instit.' vol. xxiii. p. 365.

|| 'Across Africa,' vol. i. p. 357.

¶ 'A Decade in Borneo,' p. 79.

repulsive musk-glands of the Alligator, as found in the Madeira river of Brazil, are, according to Keller, mixed with a little rose-water, and serve to perfume the raven-black tresses of the elegant Bolivian ladies at Santa Cruz de la Sierra and Cochabamba, in spite of, or rather by reason of, their strong scent, which gives the headache to all save these strong-nerved Señoritas.* In Damara Land the women wear necklaces, "the beads of which, Dokkie informed us, were made from the kidneys of the Meerkat, or other small animals, compared with whose odour that of the Polecat is mildness itself."† Mr. Bailey, in the Congo Free State, had to prevent his Kroo boys from stopping his canoes to secure the putrid flesh of a blown-out dead Crocodile, which emitted a most fetid odour. He writes:—"Many times after, when with other tribes in the interior, I remarked their preference for bad meat to fresh."‡ The Coreans are described as extremely filthy in their habits, being commonly supposed never to wash their bodies. Amongst their staple food is *Kimchi*, which "is a dish peculiar to the country, and is made of turnips, chilies, and dried fish, soused in native vinegar. This mixture is kept in jars until it ferments, and is then eaten. It has a most atrocious smell—so atrocious, indeed, that I have never heard of an European being so bold as to taste the stuff."§ According to Guillemard, the natives of the interior of Kamschatka "prefer their fish in an advanced stage of decomposition."|| Mr. Stephens, of Ugi, told Mr. Guppy that at Ontong-Java, which lies off the Solomon Group, he had known natives to allow the carcase of a pig to remain buried in the ground until it was rotten, when they dug up their treasure, and enjoyed their feast under cover of the night, as though conscious of the depravity of the act. It was the strong odour which penetrated his dwelling that attracted the attention of Mr. Stephens to their proceedings.¶ Besides the well-known fact of the peculiar odour appertaining to the black races as non-appreciated by ourselves, the American

* 'The Amazon and Madeira Rivers,' pp. 76-7.

† Baines, 'Explor. in S.W. Africa,' p. 149.

‡ 'Travel and Adventure in Congo Free State,' p. 58.

§ H. S. Saunderson, 'Journ. Anthropol. Instit.' vol. xxiv. p. 307.

|| 'Cruise of the Marchesa,' 2nd edit. p. 69.

¶ 'The Solomon Islands,' p. 92.

tribes have been known "to express dislike at the white man's smell."*

Even among ourselves it is possible to soon ignore or even welcome an unpleasant odour. This is well illustrated by the way European residents in the East soon overcome their repugnance to the evil smell of that delicious fruit, the Durian (*Durio zibethinus*). Here we have a fruit which, were it distasteful, would be banished for its malodorous qualities from any decent habitation, but for its delicious properties is welcomed on the most æsthetic tables. A similar remark applies to the Jack-fruit (*Artocarpus integrifolia*). Mr. Nicholas Pike, describing his experience of this fruit, which is highly esteemed by the Brazilians at St. Domingo, near Rio Janeiro, states that, "when cut, we could not be tempted to eat, though assured it was very nice. Being blessed with an acute scent, we could not get over its disgusting smell of putrid meat; and, strange to say, the meat-fly hovers round it, just as if it were a piece of carrion."† Nor can such a strange appreciation of disagreeable odours be confined to men of ordinary intellect. Goethe once nearly fainted when writing at Schiller's table from the effects of a dreadful odour that issued from a drawer. Schiller's wife stated that the drawer was always filled with rotten apples, because the scent was beneficial to her husband, and he could not live or work without it.‡ According to Augustus J. C. Hare, throughout life "the senses of smell and taste were utterly unknown" to the late Dean Stanley.§

May we not conclude that other animals may conquer their repugnance to an evil smell possessed by creatures of otherwise highly edible recommendations, and that odoriferous protection may prove of a highly partial and uncertain character? The Tiger, contrary to what has been generally believed, is not at all averse to putrid meat.|| Lions have a similar habit, as recorded by Gordon Cumming and Selous.

* Tylor, 'Anthropology,' p. 70.

† 'Sub-Tropical Rambles,' p. 18.

‡ 'Conversations of Goethe,' Eng. transl. new edit. p. 289.

§ 'Biographical Sketches,' p. 25.

|| Cf. Gen. D. Hamilton, 'Rec. of Sports in S. India,' p. 175, *et seq.*; and Col. Pollok, 'Zoologist,' 1898, p. 157.

It is at least open to conjecture whether the nauseous smells emitted by some animals—such as even the Skunk—are appreciated with the same intensity by all their enemies and colleagues. Great caution is required in deciding from probability, unchecked by observation, as to the protection acquired by animals either by unpleasant odour or offensive armature. The Porcupine (*Hystrix cristata*) may serve as an example. Analogy and probability would lead one to suppose that this formidably spined creature would be left severely alone. But the Leopard is said to kill it by a blow with its paw on the head; whilst the Fisher Marten (*Mustela pennanti*) kills a large quantity of Porcupines by a bite on their unprotected bellies, and eats the body, notwithstanding the quills, numbers of which are often found in the skin and flesh of the Marten, who does not seem much inconvenienced thereby. It is also apparently quite erroneous to consider all glandular or other scents of animals as being of a protective character. The Beaver (*Castor* sp.) not only secretes in two abdominal elongated glands the well-known smelling, waxy, medicinal substance "Castoreum," but so appreciates it itself that traps for its destruction are actually and successfully baited with the article, which at the same time in no way prevents the murderous onslaught of its natural enemy, the Glutton (*Gulo luscus*). The same remark applies to the Musk-Shrew (*Crocidura murina*), which, as described by Mr. Ridley, at Singapore, "often perfumes the lower part of the house with its strong musky smell. Notwithstanding this, the dogs and cats constantly kill them, though, of course, they do not eat them."* Höhnel refers to the peculiar musk scent of the Buffalo in East Africa, which "still lingered in the air" after some of these animals had passed.† He also describes the flesh of these animals as having a "strong flavour of musk."‡ Apparently the sense of smell possessed by hounds is far greater, or more finely appreciative, than that of our own. On the other hand, this sense in man appears to be highly developed, although, as we have remarked above, in different races, pleasurable and painful sensations are sometimes seen reversed. The merest

* 'Natural Science,' vol. vi. p. 29.

† 'Discovery of Lakes Rudolf and Stefanie,' vol. i. p. 125.

‡ *Ibid.* vol. ii. p. 23.

trace in a gaseous form of a drop of oil of roses* is sufficient to produce in our nostrils the impression of a pleasant odour. The smallest particle of musk is capable of imparting its characteristic smell to our clothes for years, the strongest current of air being insufficient to drive it away; and Valentin has calculated that we are able to perceive about the three-one-hundred millionth of a grain of musk. The delicacy of our sense of smell thus far surpasses that of the other senses.† If, on the other hand, the evil smelling properties of the Skunk‡—the *enfans du diable* of Gabriel Sagard-Théodat§—tend to make it avoided by animals

* Great variety is found in the scent of distinct roses. Kerner and Oliver state that the various species of the rose genus may be recognized at once by their peculiar scent. The perfume of *Rosa centifolia* is the one which in particular is understood by the rose-scent, but it is very different from that of *R. alpina*; and the latter, in its turn, is unlike any of the scents emitted by *R. arvensis*, *R. gallica*, *R. indica*, &c. *R. nasterana* has a scent strongly resembling that of pinks, while *R. lutea* and *R. punica* are notorious for their disagreeable smell. Now the hybrid roses emit odours in which the scents of the parent species are merged together in a great variety of ways. Usually the scent of the stock predominates, and there is only a suggestion of the other. Sometimes, however, an entirely new scent is evolved from the fusion of the two, as in the case, for instance (according to Macfarlane), in *Hedychium sadlerianum*, the hybrid between *H. gardnerianum* and *H. coronarium*; and, again, in other cases, one of the component odours is intensified, and the other is extinguished ('Natural History Plants,' vol. ii. p. 566).—If we may consider the different scents as at all equivalent in number to the different races or varieties of roses, then we are face to face with a most complicated phenomenon; for, according to the previously quoted authorities, on an average, sixty newly-bred roses come into the market yearly; in the year 1889 the number even amounted to 115! A rose cultivator at Meidling, near Vienna, grows in his garden nearly 4200 different kinds of roses, and yet he is still far from possessing all the forms which have been produced in recent times (chiefly by French growers) by crossing one with another. According to his estimate, the number of tea and Indian roses alone is nearly 1400, and the total number of all the different roses which the trade has produced up to the present day (1895) amounts to 6400. It would certainly appear that the scents emitted by plants are not universally of an attractive purpose. "The scent which the mosses exhale is found in no other group of plants. The same is true of ferns" (*ibid.* p. 615).

† Bernstein, 'The Five Senses of Man,' p. 289.

‡ The North American Skunks have recently been studied and their zoological position revised by Arthur H. Howell ('North American Fauna,' No. 20, 1901), who has placed them in the genus *Chincha*, Lesson, and enumerated seventeen species or subspecies.

§ 'Histoire du Canada,' p. 748 (1636).

who would otherwise seize it as prey, and its peculiar markings are held by many as constituting "warning colours," thus increasing its protection; these same all-pervading odours must serve to advertise its presence and alarm its own prey, such as Mice, Salamanders, and Frogs, unless these animals are deficient in this sense perception. This seems evident when we read that the smell "is so durable, that the spot where a Skunk has been killed will often retain the scent for days, or even weeks; indeed, Audubon relates that at one place where a Skunk had been killed in the autumn, the odour was quite perceptible in the following spring, after the snow had melted."* Frank Buckland relates that a brother officer, just returned from an American trip, told him that one day, as the train was rattling along at a great pace, "all of a sudden a most terrible smell came into the carriage. 'Oh! that's nothing,' said a passenger; 'we have just run over a Skunk'—which was the case. The Skunk's smell kept up with the train for many miles, though it was going at express pace."† A species of the same animal (*Mephitis patagonica*) was killed by Mr. Cunningham's party in Patagonia, and the cap of its destroyer, which had happened to come in contact with the animal, "was for ever afterwards rendered useless."‡ Dr. Leith Adams remembered driving one dark night, along a highway, when the effluvium of a Skunk was perceived for nearly two miles.§ Dr. Merriam describes it as "slow in movement and deliberate in action, and does not often hurry himself in whatever he does. His ordinary gait is a measured walk, but when pressed for time he breaks into a slow, shuffling gallop." This slow-moving creature, emitting this awful stench around it, must necessarily give an early alarm to all animals whose business it is to get out of its way, and thus by a principle of compensation the advantages acquired by protection from enemies are, by the same special means, discounted by the greater difficulty of procuring food.|| For if, as is well known, the offensive

* Cf. W. K. & T. J. Parker, 'Cass. Nat. Hist.' vol. ii. p. 196.

† 'Curios. Nat. Hist.' Pop. edit. ser. 2, p. 119, note.

‡ 'Notes, Nat. Hist. Strait of Magellan,' p. 110.

§ 'Field and Forest Rambles,' pp. 66-7.

|| The same remark applies to at least some of the Australian snakes. The "Old Bushman" writes:—"There is a strong scent peculiar to the Australian snakes, and I have often smelt one long before I saw it" ('Bush Wanderings

secretion of the Skunk is only emitted from the glands* when the animal is attacked or irritated, an odour so powerful as above described cannot fail to have become to a great extent distributed about its own pelage.†

The odour of musk is frequently a purely sexual character in animal life. Girard has always observed that the musky odour which is emitted by two species of *Sphinx* moths is peculiar to the males.‡ During the season of love a musky odour is emitted by the submaxillary glands of the Crocodile, and pervades their haunts.§ Dr. Junker found that the deck of the steamer on which he travelled up the Blue Nile was for some days pervaded by a musky odour after a wounded Crocodile had been despatched thereon.|| According to Mr. Ramsay, writing on the Australian Musk-Duck (*Biziura lobata*), the smell which the male emits during the summer months is confined to that sex, and in some individuals is retained throughout the year; he had never, even in the breeding season, shot a female which had any smell of musk.¶ In the Australian *Echidna*, "during the rut, both sexes produce a most conspicuous odour, which is probably destined

Nat.' p. 200).—On this point, Darwin, who seems to have anticipated most suggestions and objections bearing on his theory, must be quoted: "Natural Selection cannot possibly produce any modification in a species exclusively for the good of another species, though throughout nature one species incessantly takes advantage of, and profits by, the structures of others" ('Origin of Species,' 6th edit. p. 162).

* The glands lie on either side of the rectum, and are imbedded in a dense gizzard-like mass of muscle, which serves to compress them so forcibly that the contained fluid may be ejected to the distance of four or five metres (approximately 13 to 16½ feet). Each sac is furnished with a single duct that leads into a prominent nipple-like papilla that is capable of being protruded from the anus, and by means of which the direction of the jet is governed (Merriam, 'Mam. Adirondack Reg. T. L. S. N. Y.' i. p. 76, 1882).

† According to Mr. Hudson, the Common Deer of the Pampas (*Cervus campestris*) gives out—in the male—an effluvium quite as far-reaching, although not so abominable in character as that of the *Mephitis*? . . . Yet it is not a protection—on the contrary, the reverse, . . . and wherever Pumas are found, Deer are never very abundant. The Guachos, however, say it is protective against snakes ('The Nat. in La Plata,' pp. 159–60).

‡ 'Zool. Rec.' 1869, p. 347.

§ Owen, 'Anatomy of Vertebrates,' vol. i. p. 615 (1866).

|| 'Travels in Africa,' 1875–8, Eng. edit. p. 203.

¶ 'Ibis,' n.s. vol. iii. p. 414 (1867).

to favour the mutual approach of the animals, and enhance sexual excitement.*

In some moths—*Bombyces* and *Noctuas*—the sense of smell is developed to an extraordinary degree. “Sugar” can be found by the “Owl Moths” in the darkest night. Three female *B. quercus*, each in a cage of perforated zinc, were placed in a leather bag on a certain July 19th. On the 20th they were taken out. The bag had a sea-trip, but males continued to assemble to it for twelve days afterwards.† Even an empty pupa-case from which a female moth has escaped has been known to retain the attractive power for some time after the exclusion of the moth.‡ Clearly, these facts prove two things—that Lepidoptera possess the sense of smell, and that some species, at any rate, depend on this sense in “assembling.” They are the fox-hounds, as it were, in Lepidoptera; they course by scent, as undoubtedly butterflies and many Geometers find their mates by sight.§

In Java, according to Raffles, the Wild Pigs have so violent an aversion to the smell of urine, that the plantations are protected from their ravages by the practice of suspending rags impregnated with the fluid at small distances around the boundaries.|| We do not understand, or rather cannot give an adequate reason, why the marine worm-like creatures *Balanoglossus*, long buried in the sand of the sea-shore, “exhale a peculiar odour resembling that of the chemical substance termed iodoform.”¶ Again, the aquatic beetles *Gyrinus*, when handled, “give off a milky fluid of unpleasant odour from nearly all the joints of their body, but especially from the fore and hind edges of the thorax. The

* Semon, ‘In the Australian Bush,’ p. 160.

† J. Arkle, ‘Entomologist,’ xxvii. pp. 337.

‡ Cf. J. W. Tutt, ‘British Moths,’ p. 53.

§ J. Arkle, ‘Entomologist,’ xxvii. pp. 337–8.

|| ‘History Java,’ vol. i. p. 57.

¶ ‘Roy. Nat. Hist.’ vol. v. p. 573.—According to Mr. Bateson, as the disgusting smells emitted by various species of *Balanoglossus* may be thought to be protective, he tested various fishes with pieces of a single damaged specimen of *B. salmoneus*, which was dredged in Plymouth Sound. It was refused by both Mullet and Wrasse after trial, but was eaten by a Sole and by a Plaice (‘Journ. Marine Biol. Assoc.’ (n.s.), vol. i. p. 247).

scent is rather like that given off by Cockroaches.”* When a *Dytiscus* is captured, it often discharges a milky fluid from the thorax, just behind the head. The fluid smells like sulphuretted hydrogen.† The Y-shaped “horn,” which can be projected from near the head of the larva of *Papilio machaon*, is the source of a powerful odour of fennel—one of the food-plants of the caterpillar.‡ The scents emitted by insects cannot be always estimated as of a “protective” character. Barrows and Schwarz have stated that “it would seem that Crows have a predilection for insects possessing a pungent or otherwise strong taste or colour.” This is exemplified by the prevalence of *Carabidæ* (among them the often-recurring genus *Chlaenius* possessing a peculiar odour), coprophilous or necrophagous Coleoptera (*Silphidæ*, *Histeridæ*, and *Scarabæidæ*, *Laparosticti*), ants, and more especially by the almost constant occurrence of certain species of the heteropterous family *Pentatomidæ*. “It seems probable that the strong odour or taste of these soldier bugs is the reason why they are so eagerly sought by the Crows.”§

Gilbert White recorded an instance which appears to have a “protective” explanation. “I knew a gentleman who kept a tame snake, which was in its person as sweet as any animal while in good humour and unalarmed; but as soon as a stranger, or a dog, or cat came in, it fell to hissing, and filled the room with such nauseous effluvia as rendered it hardly supportable.”|| The same author remarks that “odours also appear to serve among animals as individual recognition signs. After ewes and lambs are shorn, there is great confusion and bleating, neither the dams nor the young being able to distinguish one another as before. This embarrassment seems not so much to arise from the loss of the fleece, which may occasion an alteration in their appearance, as from the defect of that *notus odor*, discriminating each individual personally; which also is confounded by the strong scent of the pitch and tar wherewith they are newly

* Cf. Miall, ‘Nat. Hist. Aquat. Ins.’ p. 33.

† *Ibid.* p. 61.

‡ Furneaux, ‘Butterflies and Moths’ (British), p. 140.

§ ‘Bull. No. 6, U.S. Dept. Agric., Div. Ornith. and Mamm., 1895.’ Cf. reprint in ‘Indian Mus. Notes,’ vol. iv. No. 2, pp. 86–91.

|| ‘Nat. Hist. Selborne,’ Harting’s edit. p. 86.

marked ; for the brute creation recognize each other more from the smell than from the sight ; and in matters of identity and diversity appeal much more to their noses than to their eyes. After sheep have been washed there is the same confusion, from the reason given above.”* It is certain that fishes possess the faculty of perceiving odours, and that various scents attract or repel them. A mangled carcase or fresh blood attracts Sharks, as well as the voracious Serrasal monoids of the South American rivers.† However, according to Bateson, “the range of taste and smells which fishes are capable of perceiving seems to be very small. Conger are equally willing to eat a piece of Squid or Pilchard, if it is covered or smeared with spirit, trimethylamine, turpentine, iodoform, camphor spirit, cheese of various sorts, anchovy extract, or *Balanoglossus*, as if it had been unpolluted. On the other hand, they will refuse cooked or tainted food, and food which has been soaked for a few moments in dilute acids. The same remarks apply generally to other fishes.”‡

Some Millipedes possess odoriferous glands emitting a disagreeable odour, due to the secretion of a fluid containing prussic acid. Mr. Pocock considers this “no doubt serves as a protection against birds, ants, &c., to these otherwise defenceless creatures.” But, he adds—“in a Hornbill’s nest in the British Museum, the plaster used to block the entrance is largely composed of crushed fragments of a large *Spirostreptus*.”§ The same author states that a *Solpuga*, “which frequents houses in Denver, Colorado, is said to be of service to mankind on account of its partiality for bed-bugs, a fact of some interest, as showing that the strong stench of cyanide of potassium emitted by these parasites is no protection against the attacks of the *Solpuga*.”||

The theory as to the warning colours of the Skunk presents some difficulties.¶ It was first proposed by that philosophical

* ‘Nat. Hist. Selborne,’ Harting’s edit. p. 317.

† Cf. Günther, ‘Introd. Study of Fishes,’ p. 110.

‡ ‘Journ. Marine Biol. Assoc.’ (n.s.), vol. i. p. 247.

§ ‘Roy. Nat. Hist.’ vol. vi. p. 212.

|| ‘Nature,’ vol. lvii. p. 619.

¶ The Skunk has its enemies, and is not so unmolested as has been stated. In Patagonia the Skunk is one of the most abundant animals. The traveller D’Orbigny wrote that in that country the Skunk formed the chief food of the

observer, Mr. Belt, in his 'Naturalist in Nicaragua,' wherein he described that animal as going "leisurely along, holding up his white tail as a danger flag for none to come within range of his nauseous artillery." A similar observation was subsequently made by Mr. Wallace in North America, who reaffirmed the theory, and explained its cogency by the argument that for such animals it was "important that they should not be mistaken for defenceless or eatable species of the same class or order, since in that case they might suffer injury or even death before their enemies discovered the danger or the uselessness of the attack."* But the American Mink (*Mustela vison*)—as is the case with Minks generally—is described by Dr. Coues as second only to the Skunk in the possession of an extremely offensive effluvium, and yet it is of a more or less uniform coloration, and certainly is provided with nothing that can be described as "warning colours." And although the Malayan Badger (*Mydaus meliceps*), which possesses an extremely evil odour, is somewhat similarly marked as the Skunk, and with the tip of its short stumpy tail whitish, it is described as a purely nocturnal animal. *Gymnura rafflesii* is another animal generally considered as nocturnal in its habits, and with the terminal third of its rat-like tail usually white. According to Mrs. W. P. Pryer, in Borneo, the smell which this animal emits is insufferable, and hangs about for a long time; it is so overpowering, "that I have once or twice awokened from a sound sleep owing to one of these animals having simply passed below the house."† If the colour of the Skunk is a product of Natural Selection, slowly acquired for protective—*i.e.* in this case, warning—purposes, it is at least surprising that other nauseous animals are not similarly protected. An equally probable suggestion, that of inherited intelligence on the part of its enemies is as likely to be the explanation. In fact, there is nothing to prove that its scent alone is not the Crowned Harpy Eagle; but, although D'Orbigny's statement is, according to Mr. Hudson, "pure conjecture," Mr. Hudson admits that most of the Eagles shot by himself in Patagonia, including a dozen Chilian Eagles and one Crowned Harpy, smelt of Skunk. Pumas also sometimes commit the same mistake, for their fur in some cases smells strongly of Skunk (Beddard, 'Animal Coloration,' 2nd ed. p. 178).

* 'Darwinism,' p. 232.

† 'A Decade in Borneo,' p. 75.

deterrent quality, and that its bright colours are due to at present unknown causes, and serve unknown purposes.

Some brightly coloured animals have no warning colour or other protection, but trust to their own intelligence to avoid danger. Thus "the bright colour of the male Golden Oriole renders it peculiarly liable to be attacked by the Sparrowhawk, and in such a contingency the Oriole does not trust to his Thrush-like flight enabling him to elude his tormentor in the open, but on the earliest opportunity seeks refuge in the densest thicket available as cover."* The Rose-coloured Pastor, with the back, breast, and sides of an exquisite pale pink, is observed in its continental haunts to frequent trees or shrubs bearing rose-coloured flowers, such as the blossoms of the pink azalea, among which the birds more easily escape notice.†

Many plants owe their protection from the ravages of grazing animals to offensive odours, which to ourselves are unappreciable while the leaves are intact, and these apparently possess no warning colours, or, at all events, none of those glaring hues on which the theory is founded. These, however, are avoided by the animals from whom protection is required, and who have either learned to distinguish the plants by their appearance, or have a greater delicacy of smell than ourselves. Grazing animals also avoid plants furnished with stinging hairs, which certainly seems due to observation, and probably inherited experience. The European nettles (*Urtica dioica* and *U. urens*) are generally left alone, and how much more so the *U. stimulans* of Java, the *U. crenulata* of India, and *U. mentissima* of Timor, whose stinging hairs are capable of producing severe attacks of tetanus as by snake-bites.‡ These plants, however, seem to have developed no prominent warning colours as understood by the theory; while their protection is undoubtedly real and efficient. The theory of warning colours is a brilliant suggestion, but one which seems to demand of nature an unnecessary effort to supplement protective qualities already sufficient. The argument has been thoroughly advanced by Prof. Poulton, who

* H. A. Macpherson, 'Roy. Nat. Hist.' vol. iii. p. 355.

† Jno. Watson, 'Poachers and Poaching.' p. 319.

‡ Cf. Kerner and Oliver, 'The Nat. Hist. Plants,' vol. i. p. 442.

gives as a typical example the larva of the Magpie Moth (*Abraxas grossulariata*), as a showy, self-advertising, inedible creature, regarding which "all observers agree that birds, lizards, frogs, and spiders either refuse the species altogether, or exhibit signs of the most intense disgust after tasting it."* This caterpillar is very common in gardens, and other and previous observers (Jenner Weir, Butler, and, more cautiously and critically, Beddard) have advanced a similar opinion as to its more or less immunity from attack. But Prof. Plateau, of Ghent, has subjected the question to a thorough experimental investigation, and finds that *A. grossulariata* does not disregard means of concealment, that it is protected by no special nauseous flavour, and that it is readily attacked under suitable conditions by certain Vertebrata, Arachnida, Coleoptera, Adephaga, and insect parasites. He concludes:—"The results of this research go to prove that, in the case of *Abraxas*, conspicuous coloration does not possess the warning significance which has been attributed to it, and naturalists will do well to apply further experimental tests to other cases in which this explanation has met with a too facile acceptance."† In the pages of this Journal, Mr. Page has recorded how both larvæ and imagos of this species were greedily eaten by the birds in his aviary;‡ and Mr. Oxley Grabham has found the stomachs of Cuckoos "crammed with these obnoxious larvæ."§

Although it is dangerous to state the factors of all animal psychology in the terms applied to our own, it is still as equally misleading to allow the theory of automatism to dominate our minds when observing the actions of other animals. Some of the most highly educated, as well as some of the most ignorant men contemn their other animal colleagues as speechless, and imply that articulate language as used by ourselves must be the only means for interchange of ideas, and this in face of the well-known contrary evidence afforded by "gesture

* 'Colours of Animals,' p. 168.

† 'Mém. Soc. Zool. France,' 1894, pp. 149-53.—An English abstract of this paper will also be found in 'Natural Science,' vol. vi. p. 82; and in Ent. Month. Mag. 2nd ser. vol. vi. p. 70.

‡ 'Zoologist,' 1897, p. 169.

§ *Ibid.* p. 236.

language.”* And a similar error, or danger, appears to exist in the theory of “warning colours,” as used for an explanation of a difficult problem in coloration. Some of the most brightly coloured fruits are edible, and so are gorgeous fishes, elegantly marked mammals, and brilliant birds. The evil smell of the durian does not prevent its being a favourite fruit to the Orang, as well as to man, nor does its hard and spiny envelope afford it protection.† On the other hand, many fruits obtain an undoubted advantage by their edible qualities, their seeds passing intact through the bodies of birds and other animals, and thus being scattered far and wide. The well-known nutmeg (*Myristica moschata*) affords a good example. This fruit, with its red arillus of mace, which is exposed by the splitting of the outside envelope when ripe, is both aromatic in smell and not inconspicuous in appearance. Birds, especially the Nutmeg-Pigeon (*Carpophaga aenea*) devour this fruit with avidity, and by their involuntary dispersal of the seeds caused the spice-preserving Dutch considerable trouble. These protectionists compelled the native chiefs on the islands of Ternate, Tidor, Makian, &c., to destroy their nutmeg plantations, in order that there might be no competition with the produce of their own trees in Amboyna and Banda. They employed agents to see that this destructive process was vigorously carried out, but their efforts were considerably frustrated by the birds, who deposited seeds in unlooked-for spots and inaccessible positions. As Labillardière narrated:—“This circumstance made the Company resolve to settle residents in those islands, whose principal business it is

* This shows no advance on the teachings of Socrates, who, in his discourse with Aristodemus, observed:—“A tongue hath been bestowed on every other animal, but what animal, except man, hath the power of forming words with it, whereby to explain his thoughts, and make them intelligible to others” (*cf.* G. H. Lewes, ‘Philosophy of Socrates’).

† Mr. Hornaday thus describes this edible luxury:—“The fruit is very much the same in size and shape as a pineapple, but the entire outside is a bristling array of dark green conical spines, three-fourths of an inch high, and very sharp. . . . It is a painful matter to hold a durian except by the stem, and I would as soon have a six-pound shot fall upon me as one of them. . . . This wholly abominable pod smells even more offensive than it looks, the odour given off being like that of a barrel of onions at its most aggressive stage” (*‘Two Years in the Jungle,’ p. 318.*)

continually to search for and destroy all the young spice trees they can meet with. But it also often happens that the seeds are dropped in situations so precipitous as to escape the most active vigilance.”* But here the theory “of warning colours” is discarded, and replaced by that of “edible or attractive fruits.”

* ‘Voyage in Search of La Perouse’ (1792), vol. i. p. 408.—In South Africa the fruit of the Prickly Pear (*Opuntia* sp.) is eaten by Baboons, the seeds passing through their bodies, and being deposited in a ball of dung, often in the most inaccessible spots.

(To be continued.)

NOTES ON A PRIVATE COLLECTION OF LIVING
MAMMALS DURING 1900-02.

BY GRAHAM RENSHAW, M.B.

IN spite of the rapid progress which the science of zoology has made during the last twenty years, the study of living mammals in captivity remains a comparatively neglected branch of natural history, being almost entirely left to the learned members of zoological societies. The private individuals who have systematically taken up this most interesting work may almost be enumerated on the fingers of one hand—this neglect of so fascinating a pursuit being all the more remarkable considering the activity displayed by naturalists in other departments of the animal world. Thus numerous ornithologists, not only throughout the United Kingdom, but also on the Continent, add annually to our knowledge of birds by means of observations on aviary specimens; reptiles and fish are now frequently exhibited, thriving amongst appropriate surroundings; and the life-history of many insects is known from egg to imago, thanks to the labours of countless entomologists. It is indeed to be regretted that the highly organized class of mammalia does not as yet obtain its due share of attention; perhaps this is owing to the comparatively small number of dealers who sell mammals as well as birds, and also to the general impression that the former are more expensive to buy and more difficult to keep than the latter. It should, however, be remembered that a considerable variety of wild creatures can always be purchased either in London or in Liverpool; and although those who recollect with pleasure the herds of Eland, Sing-Sing Waterbuck, and White-tailed Gnu in the Paris Jardin d'Acclimatation, or the herd of Bubaline Hartebeests in the Jardin des Plantes, will recognize that the exhibition and maintenance of such fine game animals demands a great outlay of time, experience, and money. Nevertheless there are very many lesser mammals (nowadays included amongst the attractions of every zoological garden) which are not ex-

pensive to buy, and require only ordinary care and commonsense treatment to keep them in perfect health.

Since it is only the few who are able to travel far enough to study the wild animals of the globe in their own haunts, it is obvious that our knowledge of their habits is to be advanced as much by careful observations on captive specimens as by field notes; and this domain of bionomical research is still practically untrodden. It is hoped that the following account of a series of mammals which have recently been in my possession may not only be interesting, but also act as an encouragement to others to take up the matter for themselves. The list of animals is as follows:—

CARNIVORA.

Felis tigrina (Margay Tiger-Cat).—There are certain zoological traditions which die very hard, illustrating the result of giving a dog—or any other animal—a bad name. Thus even to-day most persons believe all Zebras to be untameably wild and vicious, although *Equus burchelli* at any rate has now many times been successfully broken to harness; the black African Rhinoceros is still often supposed to be a surly, sulky savage, prone to charge without provocation, though the most recent information shows it to rather be a short-sighted, dull-witted brute, which merely rushes blindly forward when alarmed—nervous, not vindictive; and the Gorilla is still represented as a ferocious almost bloodthirsty monster, though the skins of several supposed to have been shot when charging have been found to show the bullet-holes in the back. So also the name “Tiger-Cat” has become almost proverbial for innate ferocity, and any animal of this description—whether it be Serval Ocelot or Margay—is popularly assumed to differ in size only from the savage of the Indian jungles. Many of these beautiful animals, however, become, if taken young, as tame and good-tempered as could be desired, although of course allowance must be made for individual differences of disposition, and it must be admitted that very young animals can be as spiteful or more so than their elders. I recently saw two Serval kittens which snarled and hissed at the mere approach of a stranger; in the same collection was an adult animal of the same species which allowed me to stroke him with every indication of pleasure. A very tame and

playful Ocelot kitten came under my notice in the autumn of 1900; and the Margay, though perhaps less often tamed than most Tiger-Cats, is capable of showing good nature, if not affection, towards its owner.

The Margay which I had was a six-months' kitten, greyish brown, spotted and streaked with blackish brown, and very rough-coated. It was a most good-tempered little thing, allowing itself to be stroked, and capable of amusing itself for an indefinite time with a dangling piece of string, an india-rubber ball, or its own tail, and it delighted to play with a broom, clawing and biting the bristly surface of this odd plaything as if it were the fur of a gigantic mouse. Not content with its own company, this cat would beg the spectator to play with it, uttering a plaintive mew of invitation, and pleased beyond expression if rolled about on the sawdust-covered floor of the cage by some bystander. At night it was extremely active, scampering about the roomy compartment which it inhabited, and rushing up the various perches to bounce off on to the floor immediately afterwards. Picking up and dropping a fowl's head time after time was another pastime in great favour. This Cat soon learnt to come at feeding-time if called "puss, puss!" If overfed it would become irritable, growling and even springing out at any intruder. Except for this, however, the animal never showed the slightest animosity towards anyone, thus contrasting very favourably with the young of some of the *Felidæ*, such as the kittens of the British Wild Cat (*F. catus*), which hiss and spit almost before they can crawl. My Cat lived all through the gloomy winter of 1900-01 in perfect health, and was eventually exchanged for a Temminck's Pied Hornbill (*Anthracoceros convexus*).

Tiger-Cats may be fed on raw meat, fowls' heads, and milk; some will also eat fish. These animals require plenty of room; a cage nine feet long, three high, and three deep, with suitable branches for exercise should be provided. Savage individuals of this and all other Carnivora are safest when kept in cages opened by sliding the door upwards; when released, the door is self-closing by its own weight.

Genetta pardina (Pardine Genet).—Amongst the *Viverridæ* we find many remarkable forms, from the familiar Civet-Cat

and Mongoose to the rare Eupleres of Madagascar; but few are more interesting than the beautiful Pardine Genet, with its elegant, almost Deer-like head set on a graceful neck, its handsome coat, spotted boldly in Leopard fashion, and its long tapering tail—these outward attractions being enhanced by the marvellous quickness and lithe serpentine grace of its movements as it runs like a streak of lightning across the floor of its cage, or leaps from one place to another with the agility of a Cat. My Genet was an adult male, very quiet, and indeed afraid of being hurt; he allowed himself to be stroked, and would feed from the hand when he had barely been six weeks in England. On one occasion he escaped from his cage, to which he was only restored after three-quarters of an hour's interval; even then, though thoroughly frightened, he made no attempt to bite. Perhaps the Genets, like the Giraffe, are silent animals; the one I had, at any rate, never emitted any sound whatever. He slept all day coiled up in his travelling box, at night becoming very lively, bounding to and fro in a curious manner behind the bars of the cage as if performing some set task. Genets are, if possible, even more active than Cats, therefore it is cruel to imprison them in little cages, as is only too often done; six feet is the minimum length for a cage to accommodate so agile a creature. These animals may be fed on fowls' heads, mice, or fish. In these days a chattering Monkey or a screeching Parrot seems to be the popular ideal of a zoological treasure; but to anyone wishing for a new, interesting, intelligent, and quiet pet, pleasing in its ways, and readily becoming tame, I cordially recommend the Pardine Genet.

Galidictis vittata (Grison).—The Grison is a rare animal in captivity, and I do not remember ever having seen it in any of the continental zoos; indeed, the two which arrived in England recently are the only ones I have known to be offered for sale of late years—one of these, a fine healthy specimen, is now in my own collection. The coloration of the Grison is most remarkable, grey above and dark brown below; it resembles, in fact, a small Honey Ratel (*Mellivora*), and has something of the Badger in its gait, while the webbed feet recall those of the Otter. The Grison is one of the "cutest" and most "wideawake" of wild animals; every action expresses alert intelligence and fearless self-reliance.

My example is very playful and inquisitive; as, however, it endeavours to show goodwill by inflicting friendly bites, advances are not encouraged, since it hurts to have a piece taken out of one's finger, even if only in fun. These animals will play with a bit of paper, dragging it through the wires and tearing it into bits. Everything is seized in the mouth rather than pounced on with the paws. In taking food, the Grison first sniffs at it, then suddenly grips it with its teeth and squats down to feed, holding it between the paws. During the daytime my specimen lies concealed in its sleeping box, thrusting out its inquisitive head on any noise being made, and ready on the slightest encouragement to run up to the wires,—absolute fearlessness seems to be part of its character. Although the Grison makes an interesting and novel pet, it is not one to be handled carelessly. Should any reader of the 'Zoologist' ever possess one of these rare Mustelines, he may feed it on raw meat and fowls' heads like the preceding animals.*

RODENTIA.

Sciurus sp.? (Black Squirrel).—This active little creature is not only pleasing by reason of its vivacity, but is also handsome in appearance, being blackish brown above and white below; the ear-tufts and tail are sable and very fine. These animals, when recently captured, are nervous and timid, growling if disturbed, and even rushing at the hand of an intruder. They will also bite sharply if incautiously handled. Black Squirrels utter a curious noise, apparently indicating pleasure, when gambolling about on the branches with which their cage should always be provided. Like most rodents, they are very destructive to wood-work, which should be protected by sheet iron. They will eat apples, bread, and dry food, such as Indian corn.

Cynomys ludovicianus (Prairie Dog).—Perhaps the best way of keeping Prairie Dogs is to place them in a paved enclosure, the stone floor of which will resist all attempts at escape. A quantity of suitable earth may then be heaped up on the impenetrable flooring, and thus afford the animals an opportunity of constructing their own burrows, and leading a semi-natural

* The Grison here described was purchased by the Zoological Society on April 26th, and may now be seen in the Small Cats' House at the Society's gardens.

life. This plan has been successfully adopted with the Wombats at the Amsterdam Zoological Gardens, and I have also seen it employed for Marmots. If, however, the owner is afraid that the material supplied may cave in and smother the workers, a more convenient plan is to place a large box well filled with hay in the centre of the enclosure. Holes are cut in the sides of the box for ingress and egress, and a few drain-pipes are substituted for the burrows, the whole being artistically concealed by rockwork. This method allows the owner to inspect the inside of the box at any time by removing a stone or two and raising the lid; it has, however, the disadvantage of hardly being a *natural* arrangement. Care must be taken that the central dwelling-place is kept dry and warm, and that the surroundings do not harbour damp in wet weather.

Muscardinus avellanarius (Dormouse).—The Common Dormouse is one of the few British mammals regularly kept in captivity, and with its large beady eyes, tawny fur, and almost Squirrel-like tail is deservedly a favourite. I have several times found mine dying without any obvious cause. These invalids for a day or two before death would lie semi-torpid on the floor of the cage, scarcely breathing at all, and hardly indeed to be induced by any means to quicken their respiration. One, in fact, was semi-paralysed, dragging itself across the floor with great difficulty, and only lived a few days after the disease became marked. Perhaps some epidemic affects these animals in the autumn, as is the case with the Common Shrew. Remarks on the treatment of these well-known pets will be scarcely necessary. I would point out that by introducing a small branch of a tree into their cage, the clasping action of the foot-pads may be studied. Mine were fed on apples and bread. They do not gnaw woodwork like most rodents, neither do they bite.

Dipus jaculus (Egyptian Jerboa).—A quaint little furry figure, running like a wee sprite in the moonlight and continually stopping to examine objects in its path with busy inquisitiveness—such is the Egyptian Jerboa. Rat-like in body, bird-like in movements, its tiny person is supported on an absurd pair of stilt legs and a Kangaroo tail. In the daytime the Jerboa is a soft ball of fur asleep in its box; at night its activity is a remarkable contrast to its diurnal lethargy, as it flits like a

shadow over the floor of its cage. I have now had nearly a dozen of these animals. They are cheap to buy and easy to keep, requiring no more care than so many Rabbits, and needing no artificial heat in winter if kept indoors and warmly bedded. Jerboas are extremely playful, and are fond of ploughing up the sand or sawdust on the cage-floor with their truncated muzzles, heaping it up into little mounds. They will also scramble up wire netting (presenting an extraordinary appearance owing to the great disproportion between the fore and hind legs), and will recklessly jump to the floor from a considerable height at the risk of serious injury to themselves. They are subject to a chronic wasting disease, the unfortunate animal becoming thinner and thinner month by month, although feeding and running about as usual, and I have lost several from this cause. Jerboas may be fed on crushed oats, millet seed, bread, lettuce, and cabbage. Although desert-haunting animals, they require water.

EDENTATA.

Dasyurus villosus (Hairy Armadillo).—This grotesque animal may be described almost as a mammalian Woodlouse, its jointed carapace recalling that common crustacean. In addition to its curious appearance, the Hairy Armadillo exhibits more character than would have been expected of so lowly a mammal, being markedly intelligent and even self-willed. The pleasure of keeping these edentates depends very largely on the dieting, and it must be admitted that any which are fed on meat smell most abominably; those kept on bread and milk are much less objectionable. Armadillos (when they have been acclimatized) are thus best kept out of doors, care being taken to bed them warmly in winter. They are great burrowers, and will soon be lost if the floor of the run is not made of concrete, stone, or other impenetrable material, and care must also be taken that they do not scramble up and over the walls of their enclosure. The Hairy Armadillo sleeps all day either lying semi-contracted on its side, or else on its back, often with a silly Pig-like smile on its countenance. Towards evening it wakes up, and begins to explore every inch of its prison with a steady systematic diligence, which contrasts oddly with the alert nimbleness of a Jerboa or Squirrel, the Armadillo sniffing solemnly over every part of the

floor, and thrusting its wedge-like head into every crevice; should any leverage be obtained, the animal at once commences to wrench its way out. I well remember placing my first Armadillo in a cage fronted with stout wire netting of half-inch mesh, and how, as soon as the industrious creature had found a weak spot, it prised up the wirework with its mailed snout, and then setting its broad shoulders and enormous claws busily to work, tore its way through, the staples giving way one after another with irritating rapidity. If turned out for a run on a paved floor the little mailed beast with his Pig-like eyes and pseudo-crustacean armour presents a most odd appearance as he patters about at a great pace on his stumpy legs. Fearless of injury under his natural shield, the Armadillo scrambles over, beneath, or through everything, and objects lighter than himself are promptly upset, so that one can easily credit the story of one of these animals which, when turned out for a run on a billiard table by his admiring owner, soon wrecked it by ripping up the cloth with his claws. I never knew these animals to attempt to bite. If seized hold of they resist by wedging themselves between objects, and also (apparently by accident) scratch if picked up. They soon, however, become tame enough to feed out of the hand. The unspillable zinc vessels now largely sold are best for holding water intended for Armadillos.

Dasypus sexcinctus (Weasel-headed or Six-banded Armadillo).—This is a much finer species than the preceding, from which it may be distinguished by the sharper muzzle, the more elegant outlines of the body, and the lighter colour of the armour; indeed, for an edentate, the Weasel-headed Armadillo may almost be pronounced a handsome animal. A fine male, which I purchased last January, would hiss when picked up, but made no other hostile demonstration. Instead of sleeping on his back like the Hairy Armadillo, this animal reposed on his stomach. Food and treatment the same as *D. villosus*.

MARSUPIALIA.

Trichosurus vulpecula (Vulpine Phalanger).—The Vulpine Phalanger (often mis-called Opossum) resembles a Fox in the sharpness of its muzzle, a Bear in the woolly nature of its fur, and a Cat in the stealthiness of its movements. Adult animals

are often spiteful and will bite severely, though capable of becoming fairly tame after a time. Young individuals, when tame, make delightful pets, as full of play as a kitten, and making most astonishing bounds from place to place, hardly to be expected of so heavy-looking an animal. The Vulpine Phalanger can run well, though rather clumsily; but it is most at home if given a tree-trunk to climb about on, the tenacious grasp of the claws being often assisted by the prehensile tail, which has a bare area on its lower surface to afford a firmer hold of the branches; so strongly do the caudal tendons act, that even a dead Phalanger may be suspended securely by hooking the tail round one's finger.

Tame individuals may be allowed to climb about the person of their owner like a Kinkajou or Bassaris. When fairly awake for the evening they are quite agile in their movements, hanging from a branch suspended merely by the tail, creeping along the under surface of a bough almost like a Sloth, and occasionally twisting themselves round so as to seat themselves on the upper surface of their perch, when they will sit up on their haunches like a Kangaroo; indeed, in this latter attitude they much resemble a small Wallaby. Phalangers may be fed on bread, apples, lettuce, and carrots. One of my specimens would eat birdseed, and even dried Ants' eggs. They cannot stand much damp, and a foggy winter must be guarded against by artificial heat.

The above list of mammals, though not a very large one, indicates sufficiently what may be done by any private individual attempting the study of living mammals (without the abundant resources of wealthy zoological societies), and only adopting commonsense treatment of the animals. It may be added that foreign Mammalia do not require to be kept day and night in a hot-house temperature, but are much better if not coddled. Dry cold will not do the majority of them much harm, but draughts, damp, and fog must be carefully avoided. The most convenient way of keeping them is to have the collection in a snugly built outhouse, lighted from the top to economise wall space; and during the past winter I have found that a building fourteen feet long, twelve feet wide, and ten feet high can be kept comfortably

warm by a couple of small portable oil-stoves, similar to those used for heating bedrooms—these are more convenient and less costly than a fixed gas-stove. Every cage should communicate with a separate out-door run (which need not be very large), and thus every animal can get its share of fresh air. Wirework, painted black, allows the animals to be seen better than the same material galvanized and unpainted; for this purpose Brunswick black is the best application, being cheap, drying quickly, and non-poisonous. Sawdust should be freely sprinkled over the floor of the cages. It has many advantages, being cheap, warm to the animal's feet, absorbent, deodorant, and innocuous if inadvertently swallowed. The feeding and drinking vessels should be unspillable, and if made of zinc will be non-absorbent, and not liable to rust.

In conclusion, it may be stated that this essay has touched merely upon the fringe of a highly interesting but sadly neglected subject, and that there are many other animals which can be obtained and easily kept—Mongooses, Agoutis, Badgers, Racoons, and the like. It is to be hoped that amongst the host of zoological pursuits which nowadays attract the attention of enthusiasts, the study of captive Mammalia may eventually take its due place. Already the extensive breeding of Silver Foxes in confinement for the sake of their fur indicates a step in this direction; and although this is a business matter undertaken for the sake of profit, it is surely not too much to expect that in this era of progress some will undertake for the sake of science alone a pursuit so fascinating, so interesting, and so novel as the systematic observation of living Mammalia.

THE BIRDS OF THE TRANSVAAL: NOTES MADE
AT WATERVAL ONDER.*

By F. J. ELLEMORE.

THE following observations were made between Nov. 6th and 14th, 1897 :—

Halcyon orientalis (Peters' Kingfisher).—Not uncommon. Procured six specimens (five males and one female). Discovered nest in a hole in the river-bank containing three fledglings.

Two Cuckoos—one, a male, corresponding with the description of *Coccystes jacobinus* (Layard and Sharpe's 'Birds of South Africa,' p. 158), with the exception that the eyes are olive ; the other a female, which in every particular corresponds with the male of *C. serratus* (*ibid.* p. 161). Ovaries very well developed ; one egg almost full size, but wanting shell ; quite the size and shape of the egg of the Golden Cuckoo (*Chrysococcyx cupreus*). Both these birds were in company, and the only Cuckoos seen in the district during a stay of eight days. In my excitement I shot badly, but this gave me a better opportunity of observing them. Each time when shot at, they flew to separate trees, but were soon together again ; when the male was shot, the female did not fly off when approached, and so was easily procured.

Pogonorhynchus torquatus (Black-collared Barbet).—These birds were always to be found on the topmost branches of the wild fig-trees early in the morning, and were easily approached when feeding. Not common.

Batis molitor (White-flanked Flycatcher).—Uncommon ; saw only two pairs, which were procured. Discovered nest in the fork of a bush five feet from the ground. The nest was a neat

* Waterval Onder is on the railway line between Pretoria and Delagoa Bay. It represents the sudden descent of the line from the high veld to the warmer lowlands. Several of the birds enumerated by Mr. Ellemore as found at this spot were never seen by myself when collecting near Pretoria, on and off, during a period of four years.—ED.

little structure, cup-shaped, composed of grass and fibrous roots, the outside covered with lichen and moss, fastened with cobwebs.

Terpsiphone cristata (South African Paradise Flycatcher).—Shot several of these birds. One male 15 in. long; centre tail-feathers, $11\frac{1}{2}$ in. Two other adult males with centre tail-feathers extended no longer than is usual in any other birds; one female with the two centre tail-feathers lengthened half an inch. Discovered a nest in the fork of a slender bough almost overhanging the river. A small cup-shaped, grass-lined nest, with a few patches of lichen and bark on the outside—a striking contrast to the neat little nest of *Batis molitor*. It contained a newly-hatched young one, and an egg.

Amydrus morio (Cape Glossy Starling).—Very numerous, breeding in crevices of the rocks, usually about 25 ft. from the ground, and close to the river; always on the wild fig early in the morning. They seem to breakfast on fruit, and dine on locusts and other insects, which they catch on the wing.

One bird, apparently a Thrush, and believed to be new to science. Male; food, insects; eyes brown. I do not know the habits; it must either be very shy or scarce, as no others were seen in the district. Dr. Exton kindly offered to send this bird to Mr. Bowdler Sharpe for identification; but it has been since identified by Mr. J. Hyde, Jun., as the Sentinel Rock-Thrush (*Monticola explorator*).

We also procured specimens of:—*Ceryle maxima* (Great African Kingfisher), *Corythaix musophaga* (White-crested Plantain-Eater), *Dendropicus cardinalis* (Cardinal Woodpecker), *D. menstruus* (Red-vented Woodpecker), *Turdus olivaceus* (Olivaceous Thrush), *Pycnonotus tricolor* (Black-eyebrowed Bulbul), *Monticola rupestris* (Cape Rock-Thrush), *Cinnyris amethystinus* (Amethyst Sun-bird), *Parus niger* (Southern Black-and-White Tit-mouse), *Laniarius cubla* (Lesser Puff-backed Bush Shrike), *L. senegalus* (Common Red-winged Bush Shrike), *Lagonosticta rubricata* (South African Ruddy Waxbill), *Dicrurus ludwigi* (Small Drongo), *Poliospiza gularis* (Streaky-headed Grosbeak).

OBITUARY.

JOHN CLAVELL MANSEL-PLEYDELL.

READERS of 'The Zoologist' will learn with regret of the death, after a few hours' illness, of John Clavell Mansel-Pleydell, of Whatcombe, Dorset, at the advanced age of eighty-four. He was one of the few remaining representatives of the older school of general naturalists, and his wide knowledge ranging over so many different branches of zoology rendered him, if not an infallible guide in the study, at any rate an invaluable companion in the field.

He was also one of the prime movers in the formation of the Dorset Natural History and Antiquarian Field Club more than twenty years ago, and had filled the office of president ever since. During that period, in addition to numerous papers on Palaeontology, and addresses on many subjects, he has contributed several volumes on the fauna and flora of his native county.

His kindly disposition, and the readiness with which he gave assistance to any who desired it, have endeared him to all with whom he came into personal contact; and whether as a personal friend, or as president of the Dorset Field Club, his death has created a loss which will be by no means easily made good.

Amongst the more important of his publications are the following:—'The Flora of Dorset,' London, 1874; 'The Birds of Dorsetshire,' London, 1888; 'The Flora of Dorset, with a Sketch of the Geology,' ed. 2, Dorchester, 1895; 'The Mollusca and Brachiopoda of Dorsetshire,' Dorchester, 1898; 'The Ornithology and Conchology of the County of Dorset'; 'A Brief Memoir of the Geology of Dorset,' Blandford.

F. P. C.

NOTES AND QUERIES.

MAMMALIA.

Hybrid between Donkey and Burchell's Zebra.—Just before the mail leaves (April 5th), I want to give you the first information about the birth of a hybrid between a male American tame Donkey and a female Burchell Zebra. I cannot have a photo taken to-day, as the mail leaves in an hour; but you will have the first print of it. It is very little striped across the hocks and ears, and has a black stripe all along the back. The colour is a rich reddish fawn, lighter underneath; it has a white star, and four white feet, like the father. It looks strong and healthy, and is probably of great interest, as it may be able to resist tsetse-fly and horse-sickness.—J. W. B. GUNNING (Pretoria Museum and Zoological Gardens).

Pine-Marten in Ross-shire.—On the 21st of April last a very beautiful specimen of the Yellow-breasted Marten (*Mustela martes*) was trapped in Ross-shire. It measured over thirty inches in length, and is of a uniform dark brown colour, except the breast, which is yellow. Some lambs were attacked in the district where this Marten was killed, and the people there think it was the work of this animal (?). It has been sent to me for preservation.—JOHN MORLEY (King Street, Scarborough).

AVES.

Varieties of Blackbird, Thrush, and Starling.—During last winter I saw no fewer than four Blackbirds (three males and one female) with more or less white in the plumage, all from different localities in this neighbourhood; one of the specimens was peculiarly marked, the head and fore part of the body being white, and the hinder half of body and tail being the usual black. Also a Song-Thrush, almost wholly white, except a few dark spots on breast, and here and there a patch of the usual pale brown upon different parts of the body; tail of the normal colour, except the two middle feathers, which are of a dirty white. The appearance of the bird at first sight reminds one very forcibly of the Clouded Magpie Moth (*Abraxas ulmata*), as some of the spots, especially on the side of the neck, are much darker than others, which appear

clouded and uncertain in outline. The most interesting variety I have seen was a Starling, which had been caught in a trap early in January. The head is much darker than the rest of the body, the back, wings, and tail are of a pale reddish buff, the under parts being of a darker hue, and the whole plumage is very closely and prettily speckled, the tip of each feather being more or less white instead of amber, as in the ordinary bird. Viewed at a little distance, the bird has a dark head, and the plumage gets gradually lighter to the tips of wings and tail, which are almost white. The legs and feet are of the usual reddish brown, beak the horn-colour of winter, and the eyes were normal. The person to whom the specimen belonged suggested that it was an undeveloped albino, but I think not, as in the white Starlings I have seen the legs and beak were much paler, and, if I recollect rightly, the eyes were pink, which, I believe, are the characteristic marks of a true albino.—G. B. CORBIN (Ringwood).

A Mimicking Song-Thrush.—Many birds are well known to be gifted with the power of imitating the songs of other birds, but until this morning (May 5th) I was not aware that the Song-Thrush (whose performance I have always thought rather poor) had the power of imitation well developed. A Thrush sings nearly all day in my garden, where I suspect it has its nest, and its cheerful but monotonous notes are heard from about 4 a.m. until dark. I have, however, been under the impression that this spring my garden has been specially favoured by various British songsters—the Robin, Hedge-Accentor, and Great Tit I have seen repeatedly—but the notes of the Wren, Willow-Warbler, and Spotted Flycatcher have on several occasions awakened my interest. This morning, whilst watching the Thrush in one of my trees, I heard him imitate the Wren, Robin, Spotted Flycatcher, Starling, and Great Tit perfectly. Surely this is unusual.—A. G. BUTLER (124, Beckenham Road, Beckenham).

Early Flycatcher in Northumberland.—On April 24th, near Shotley Bridge, I saw for a moment two birds which I felt almost sure were Spotted Flycatchers (*Muscicapa grisola*). I could not, however, stop to make sure; but three days later (on the 27th) I saw two Spotted Flycatchers in the valley of the Blyth at Stannington, near Morpeth, and watched them for some time at a distance of five or six yards. There was nothing to show that the birds were a pair. I have never previously seen a Flycatcher before the 12th of May.—E. LEONARD GILL (Natural History Museum, Newcastle-on-Tyne).

Lesser Redpoll breeding in Yorkshire.—In the month of February
Zool. 4th ser. vol. VI., May, 1902.

last, Mr. Harper, Secretary of the Bradford Scientific Society, sent me a photograph of a nest which he alleged to be that of a Lesser Redpoll (*Linota rufescens*), built on the ground amongst bracken. Being uncertain whether the species had been properly identified, I wrote him about the matter, as I surmised it might turn out to be the nest of a Twite, and asked for more details. He, however, remained unshaken in his belief of the accuracy of his observation, intimating his intention of forwarding an egg for determination. The egg was duly received on Feb. 14th, and there can be no doubt but that Mr. Harper was correct in naming it as that of the Lesser Redpoll ; and he further stated that within a very limited area there were five, if not six, nests, all built on the ground amongst bracken. For obvious reasons it would not be prudent to reveal the exact locality, but within a short distance of the station chosen was a plantation which seemed much more suitable for nesting purposes. In this district I have never met with nests on the ground, and never many nests together, and it only serves to show how species may vary in their habits in different localities.—E. P. BUTTERFIELD (Wilsden).

Ravens Nesting in Co. Antrim. — Whilst exploring a range of precipitous inland cliffs to-day (April 20th)—the exact spot I think it perhaps best, in the interest of ornithology, not to advertise—I came upon the nest of a Raven (*Corvus corax*), containing four almost fully-fledged young birds. The parent birds kept flying about the cliffs overhead, uttering their loud croaking sound all the time I was in the vicinity of their nest. Aided with a pair of powerful field-glasses, I was able to make a close examination of the nest and the four wide-open mouths clamouring for food, and when one of the parent birds came in sight they all made a scramble to get on to the edge of the nest, two being successful, and afforded me the pleasure of a good view. The nest—an immense structure of sticks almost white with droppings—was placed in a niche in an inaccessible part of the cliff, about thirty feet from the ground. On the mountain-side close by I found a freshly-killed lamb, with its eyes torn out and partly disembowelled, at the sight of which a keeper on the estate, who accompanied me, vowed he would shoot the “vermin.” However, after a little persuasion, I got his promise to leave them unmolested, and allow them to finish their business in peace. I was informed by an old resident, it is now over thirty years since Ravens bred in the locality.—W. C. WRIGHT (Charlevoix, Marlborough Park, Belfast).

Condor laying in Confinement.—A Condor (*Sarcophamphus gryphus*), kept at the Natural History Museum, Newcastle-on-Tyne, laid its first

egg on April 10th. This Condor was brought from the Andes of Chili as a nestling sixteen years ago, and has grown up to be a remarkably fine and healthy mature bird. The egg is chalky white, and normal in every way.—E. LEONARD GILL (The Museum, Newcastle).

A former Warwickshire Herony.—A few pairs of Herons were nesting in Trickley Coppice (a large plantation about a mile and a half distant from Middleton) in 1852—so I learn from the keeper that came into that neighbourhood at that date—and they continued nesting there until about 1875, when evidently one of the pairs first left that cover in favour of a much smaller plantation, some thirty acres in extent, close to Middleton Hall. Here they received the interest and protection of Col. Hanbury Barclay, who resided there at that time, and to whom I am indebted for the following information from notes made at the time:—

“ 1875. Heron’s egg picked up broken at the bottom of an oak-tree in the Kitchen Garden Wood. Some time previously I had noticed a pair of Herons about, and thought perhaps they intended nesting. They started building in a fir-tree, but abandoned that in favour of an oak. On 7th May the bird was sitting. 1876. May 5th, took two eggs from a nest. 1878. Four nests on 14th March; two birds were sitting. The nest from which two eggs were taken two years previously had been greatly increased in size, and again contained eggs. 1879. Six nests hatched out about 22nd April. 1880—the year I left Middleton—there were about twelve pairs in the herony. I consider the success I had in forming this herony was partly owing to keeping the plantation perfectly quiet for a fox-covert.”

The keeper mentioned that thirteen nests were the greatest number he counted at any one time. After this date, with another tenant at Middleton Hall, their presence was evidently not so welcome, and their numbers began rapidly to decrease; added the fact, as I understand, one of their nesting-trees was blown over. They ceased to nest there some few years afterwards, and two or three remaining pairs again returned to Trickley Coppice, where, I understand, they reared young; but eventually they were molested, and eggs robbed. My personal experience is that in March, 1892, there were four old nests still remaining—one, perhaps, that of two years previously, the others probably of a still earlier construction.—J. STEELE ELLIOTT (Clent, Worcestershire).

Wild Duck: Female in Male Plumage.—On the 15th or 16th of January last a very interesting specimen of the Wild Duck (*Anas*

boscas) was killed on the Avon. I saw it very soon after it was shot, and its size, together with the peculiarity of its plumage, at once attracted attention. On referring to 'Yarrell,' I found an almost identical specimen described as a "female having assumed, to a considerable extent, the plumage of the drake, even to the curled feathers of the tail." In the specimen of which I write the plumage partakes of both sexes, the male perhaps most conspicuously; but the measurement and weight were that of an undoubted old female in not very prime condition, if I may judge from the tough manner in which the skin was attached to the flesh. I may describe it as follows:—Crown and back of neck glossy green; cheeks and throat pale brown, dappled with darker brown; white ring almost complete; breast chesnut-brown, with dark—almost black—spots and streaks; back and sides difficult to describe, so mixed are the colours with the black and tawny of the female, and the grey mottled pencilling of the male; under parts lighter; legs, feet, and beak female, the webs of the feet being darker than the legs or toes; the beak orange-brown on sides and tip, with broad central dark greenish black mark, and black nail. The tail both below and above is male—even to the four velvet black curls—but the outermost lanceet-shaped feathers, which in the ordinary male are white with grey centres, are in this bird, white with dark brown shafts and markings. Several people who saw the bird pronounced it hermaphrodite, but on dissection the sexual organs were found to be altogether female, much diseased and shrunken, and of a very dark colour. An equally conclusive proof of the gender was in the size and form of the bony labyrinth at the end of the windpipe. It has been suggested that it is a male in the annual moulted change of plumage, but if its anatomy had not proved it otherwise, the time of year would have been against such a conclusion.

Whilst on this subject, I may mention that a few years ago a brother-in-law of mine had a Bantam hen which laid for two seasons, then ceased laying, and assumed almost the complete plumage of the cock; and I have on several occasions seen Pheasants in a like condition.—G. B. CORBIN (Ringwood).

Note on the Pairing of Moor-hens.—In case it may be of any interest to naturalists, and also to put on record a fact, in the nature of which there lies, as I believe, a deep significance—and that in more ways than one—I send the following note on the pairing (*i. e.* copulation) of the Common Moor-hen, as witnessed by me, and taken down then and there. It is as follows:—

"April 23rd, 1902.—Have just seen the pairing of Moor-hens. The

two were walking side by side, and, it being a back view, I noticed at once that the tail of one of them was expanded, the white feathers being conspicuously shown. This one held the neck a little high, rigid, and curved like a sickle, the head and beak pointing straight down to the ground. It walked with a sort of stately high step, having a good deal of spring in it (such as I have once before noted in winter), and kept a little in front of the other. By reason of this display—for such it may certainly be termed—I took it to be the male, and, as the sequel will show, it may just as well have been as the other, the feathers of whose tail were but little, if at all, expanded, and who in all other respects presented a quite ordinary appearance, seeming—I think, as a consequence—to be a good deal smaller. All at once the displaying bird crouched, upon which the pairing took place, the supposed female acting as, under such circumstances, the male bird normally acts. She then assumed all the port and aspect that the other one had previously had—but had now quite lost—and, thus transfigured, made a proud little stately march in front of him, crouching then, in her turn, upon which there was a second—and reversed—pairing, which, however, was very short, and appeared to me to be but partially successful. The Moor-hens, in fact, acted exactly as did the Great Crested Grebes that I watched; and if this be not a relic of hermaphroditism—functional hermaphroditism, real or simulated, it certainly is—I know not how to account for it. A few minutes afterwards, on the opposite side of the water, precisely the same thing, in every particular, took place, except that here it was obvious that the second attempt to pair was a failure; the action, here, of the first male bird—if I may so speak—after the first pairing, was even more pronounced than on the other occasion. After the second attempt, only, both birds seemed as satisfied as though it had been successful—an important point, I think, to bear in mind in considering the meaning of these curious relations, for the second *noctes* may be in process of becoming a formality, though I certainly do not think it has yet become one either in this species or the Grebe.—EDMUND SELOUS (19, Clarence Square, Cheltenham).

Notes from Aberdeen.—Lapwings (*Vanellus cristatus*) appeared here on Feb. 23rd; Lark (*Alauda arvensis*) singing, Feb. 23rd. Comparatively little singing heard this spring. Curlews (*Numenius arquata*) on March 7th; Pied Wagtail (*Motacilla yarrelli*), March 14th; Grey and Yellow Wagtail (*M. melanope*), April 3rd. These birds are rather more common than usual. Grèy Redshank Tattler (*Totanus calidris*), April

6th ; this bird may be termed intermittent here, for, though in some seasons they appear, in others they are scarcely seen. Ring-Ouzel (*Turdus torquatus*), April 7th. Dunlin Sandpiper (*Tringa alpina*), April 17th ; these birds are increasing in numbers here. Whin-bush Chat (*Pratincola rubetra*), May 2nd. I have seen one Cuckoo, April 30th ; but the weather has been cold.— W. WILSON (Alford, Aberdeen, N.B.).

Corrections.—The following apply to my last Norfolk Notes :— Page 83, line 26, for “supposed to be” read “very possibly.” Page 99, line 11, for “*maruetta*” read “*carolina*.” — J. H. GURNEY (Keswick Hall).

EDITORIAL GLEANINGS.

In a Supplement to 'Great and Small Game of Africa,' published by Rowland Ward, Ltd., Mr. Lydekker naturally describes and figures the Okapi. He writes :—“ No European appears hitherto to have seen a living Okapi, and such accounts of its habits as we possess at present are derived from native sources. According to the information elicited from the forest dwarfs by Sir Harry Johnston, the Okapi generally goes about in pairs—male and female—and neither sex has horns. It inhabits only the most dense portions of the forest, and feeds chiefly by browsing upon leaves. One curious problem connected with this animal awaits explanation, namely, the reason for its very peculiar type of coloration, which is almost certainly of a protective nature. The striping of Zebras, as is well known, renders these animals practically invisible in the open at a comparatively short distance ; and a similar explanation naturally suggests itself in the case of the striped limbs of the Okapi. If we could imagine the creature living in such circumstances that its body was concealed among foliage while the limbs were exposed to view, such an explanation would fit the case. The darkness and gloom of the densest parts of the forest in which the Okapi is said to dwell are, however, described as being so intense that protective resemblances of this nature would apparently be superfluous. Before a definite opinion can be given on these points it will be necessary for a competent observer to see the creature in its native haunts.”

MR. D. LE SOUËF has contributed to the last number of the 'Emu' a second part of his paper on "Protective Colouration of Australian Birds and their Nests." We read :—“ Honey-eaters vary much in colour, but the males and females do not, as a rule, vary much in markings, but by far the larger majority of hen birds have greenish or dull-coloured backs. Their nests are mostly hanging, and built in varying situations, according to the colour of the bird, and you can generally make a good guess at the shade of the owner's back by the place it builds its nest in : if among green leaves at the end of a branch, the bird will probably be greenish, as, for instance, *Ptilotis cancellata* (White-plumed Honey-eater) ; if lower down among the dead branches, grey or brown ; and if in very thick vegetation low

down, the markings will be fairly conspicuous, like in *Meliornis novæ-hollandiæ* (White-bearded Honey-eater). Honey-eaters are a large group, but if notice be taken it will soon be seen how the various kinds are protected, mostly by the birds building in places which assimilate with the colour of their backs, as before stated."

IN 'Annual Reports, Proceedings, &c. (vol. xv.) of the Barrow Naturalists' Field Club' is the report of a very interesting lecture by Mr. Harper Gaythorpe on "The Blackbird in Furness: its Nesting Habits." In his researches among published works, and from careful observers, the lecturer stated that he had been unable to get any very definite information as to which bird, the male or the female, was the nest-builder, or whether both took part in building the nest. Out of about three hundred "British Birds" referred to by the author of 'Forty Years in a Moorland Parish,' he found that as to the building of nests, fifty-six birds were referred to in connection with *the* nest, thirty-five by *its* nest, eleven by *their* nest, eight by *her* nest, and only two by *his* nest, the latter being the Blackbird and Ring-Ouzel. As these remarks were entirely at variance with his own observations, the lecturer thought it was very probable that locality had something to do with the matter, and that the shyness and wariness of the Blackbird prevented the male from assisting in the nest-building where the site chosen by him was near to a dwelling, as in the case he brought before them.

Mr. Gaythorpe has proved himself a good recruit to the body of "bird-watchers," and the results of his prolonged observations are as follows :—

- a. No nest-building was done after 7.30 a.m.
- b. The male bird did not assist in building the nest, but he chose the site.
- c. He seldom sat on the eggs during incubation.
- d. But was most attentive to the young ones after they were four days old.
- e. The eggs were hatched on the 14th day; and
- f. After the same number of days the young ones could fly, and in about four weeks could take care of themselves.

WE are glad to welcome the first number of 'The Field Naturalist's Quarterly,' edited by our sometime contributor, Dr. Gerald Leighton. It is addressed to all lovers of nature, rather than to more serious students of zoology, and we trust will meet with a deserved success. Messrs. Wm. Blackwood and Sons are the publishers, to whom we are indebted for a copy of the publication.

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BIRDS COLLECTED AND OBSERVED IN THE DARBHANGA DISTRICT, TIRHOOT, BENGAL.

By GORDON DALGLIESH.

THE country does not require much description, in most parts being almost flat. Small woods, mostly formed of mango trees, are plentifully scattered over the plains. Rice is largely grown, besides other crops, as maize, wheat, and oats. Here and there are large sheets of water, which in winter abound with all kinds of water-fowl. The principal rivers are the Kamla on the west, and the Bolan on the east, both flowing from the hill ranges of Nepaul.

My thanks are largely due to Mr. C. M. Inglis, who furnished me with many interesting notes, which help to make this paper more complete than it would otherwise have been.

Corvus macrorhynchos, Wagl. (Jungle-Crow). — Common. Commences building in February. Eggs found in March and April. The nest, which is a large mass of sticks, and lined with dried grass and roots, is placed in mango or pepul trees. Usual number of eggs from three to four.

C. splendens, Vieill. (House-Crow). — Very common, more so than the last. Breeds throughout the district in May and June. Usual number of eggs four, though I have taken a nest containing five.

Dendrocitta rufa, Scop. (Common Tree-Pie).—Very common. Frequents mango groves and gardens. It is very fond of eating eggs and young birds, and does great damage to peas when they are ripe. It breeds in April and May, building in mango and sisoo trees. The usual complement of eggs is three.

Parus atriceps, Horsf. (Indian Grey Tit).—Fairly common. Though some do remain to breed, the majority are cold-weather visitors.

Argya caudata, Dum. (Common Babbler).—I have not found this bird at all common anywhere in the district.

Crateropus canorus, Linn. (Jungle Babbler).—Very common everywhere. Seen always in small flocks. This bird is known to Europeans in India as the "Seven Sisters." They breed nearly throughout the year. The nest is made of dried grass, and contains from four to six deep blue eggs. These birds may often be seen mobbing Hawks and Owls, keeping up the while their noisy chatter.

Zosterops palpebrosa, Temm. (Indian White-Eye).—Very common. Found during winter in small flocks. They build during May, making a very neat little nest of grass lined with thistle-down and small feathers. The nest is usually placed on a mango tree a few feet from the ground, and is well concealed by leaves. Three is the full complement of eggs.

Ægithina tipha, Linn. (Common Iora).—Very common in all the well-wooded parts of the district. This bird is silent, as a rule, during winter, but as soon as the warm days begin to set in its curious ringing cry is heard in nearly every mango grove. It is on the whole a shy bird, and keeps well out of sight among the thickest part of a tree. They breed from April to July, laying three eggs.

Molpastes bengalensis, Blyth (Bengal Red-vented Bulbul).—Exceedingly common. Breeds from March to August. Three is the full complement of eggs.

Otocompsa emeria, Linn. (Bengal Red-whiskered Bulbul).—I have always found this bird rare. I have only one pair, shot in a garden.

Sitta castaneiventris, Frankl. (Chestnut-bellied Nuthatch).—Common in all well-wooded parts of the district. Breeds from March to April. It lays its eggs in the holes of trees. The hole

is always plastered round with mud. Five is the full complement of eggs.

Dicrurus ater, Herm. (Black Drongo).—Very common. They are most pugnacious birds, always fighting amongst themselves, and attacking every bird they come across—even birds as big as Kites. This is the earliest bird to rise, and the last to retire. Its note is very often heard long before daylight. It breeds in April, May, June, and July.

D. cærulescens, Linn. (White-bellied Drongo).—A pair were shot by Mr. C. M. Inglis in the Madubuni Sub-division.

Dissemurus paradiseus, Linn. (Racket-tailed Drongo).—Mr. Inglis writes:—"Five were seen at Sarso, five miles west of Jhanjrurpur, on Jan. 9th, 1899."

Acrocephalus dumetorum, Blyth (Blyth's Reed-Warbler).—Very common during winter.

Orthotomus sutorius, Forst. (Indian Tailor-Bird).—Very common. Breeds during March, April, May, and June. One nest I knew of was built on a Croton plant, which was in a pot standing in the verandah of a house. Four is the usual complement of eggs.

Cisticola cursitans, Frankl. (Rufous Faintail-Warbler).—Very common. Breeds in March, July, and August.

Prinia inornata, Sykes (Indian Wren-Warbler).—Common. Breeds in June and July. The nest is built among long grasses, and on the indigo plants. Three to four is the full complement of eggs.

Lanius nigriceps, Frankl. (Black-headed Shrike).—I have seen this bird several times during winter among sugar-cane.

L. tephronotus, Vig. (Grey-backed Shrike).—Rarer than the last, and also a cold weather visitor.

L. cristatus, Linn. (Brown Shrike).—Common during winter. It sometimes arrives as early as the end of August, but this is exceptional, the majority of birds arriving in October.

Tephrodornis pondicerianus, Gmel. (Common Wood-Shrike). Scarce. I have only two specimens in my collection.

Pericrocotus speciosus, Lath. (Scarlet Minivet).—One specimen seen by Mr. Inglis in the district.

P. peregrinus, Linn. (Small Minivet).—Very common in all mango groves. Breeds during April, May, and June. The nest

is a neat cup-shaped affair, composed of moss and lichens. Three is the full complement of eggs.

Campophaga melanoscista, Hodgs. (Dark-Grey Cuckoo-Shrike).—Not a common bird.

Grauculus macii, Less. (Large Cuckoo-Shrike).—A common cold weather migrant.

Oriolus indicus, Jerd. (Black-naped Oriole).—One specimen was seen by Mr. Inglis at Narhar.

O. kundoo, Sykes (Indian Golden Oriole).—A common summer migrant. It breeds during April, May, June, and July, usually in mango trees. This bird has a fine melodious whistle. The young follow their parents for some time after they are fledged.

O. melanocephalus, Linn. (Black-headed Oriole).—Very common and a resident. Breeds in March, April, June, and July.

Pastor roseus, Linn. (Rose-coloured Starling).—Very rare. I shot a single specimen at Dalsingh Serai on March 4th, 1900. I saw several feeding in a carrot-field, in company with some Mynahs; but I only managed, with great difficulty, to secure the one, as they were very shy at the approach of a gun.

Sturnus menzbieri, Sharpe (Common Starling).—A common winter visitor, appearing in large flocks, and usually found in rice-lands. I have often noticed mixed flocks, consisting of this bird, *Acridotheres tristis*, *Sturnopastor contra*, and *Corvus splendens*.

Sturnia malabarica, Gmel. (Grey-headed Mynah).—Common, and breeds in the district. The nest is made in the hole of a tree. Four, I think, is the full complement of eggs. These birds are very fond of the fruit of the pepul tree (*Ficus religiosa*). They are gregarious in their habits, keeping to themselves, and not mixing much with other birds.

Temenuchus pagodarum, Gmel. (Black-headed Mynah).—Fairly common. A nest found at Dalsingh Serai on June 23rd, 1901, contained three half-fledged young and one addled egg. The nest was in the hole of a mango tree a few feet from the ground.

Acridotheres tristis, Linn. (Common Mynah).—Exceedingly common, and breeds almost everywhere. I have found their nests in holes of trees, under the thatch of houses, holes in walls,

and in pigeon-cotes. They begin to lay in May. Five is the full complement of eggs. A curious pied variety of this bird was shot by Mr. C. M. Inglis at Jainagar. An albino was seen by my brother at Dalsingh Serai.

A. ginginianus, Lath. (Bank Mynah).—Not a very common bird. They breed in holes in the banks of rivers. Four to five is the usual number of eggs.

Æthiospar fuscus, Wagl. (Jungle Mynah).—This is, I have found, the rarest Mynah we have. They do not, I think, breed in the district, as my collectors never came across a nest. They disappear about May, and return again in July.

Sturnopastor contra, Linn. (Indian Pied Mynah).—Quite as common as *A. tristis*. Breeds in April, June, and July, making a large untidy nest of grass in a mango or pepul tree. They breed, as a rule, in small colonies. Five is the full complement of eggs.

Siphia parva, Bechst. (European Red-breasted Flycatcher).—A cold weather visitor, and common in mango groves.

Cyornis superciliaris, Jerd. (White-browed Flycatcher).—One specimen shot by Mr. C. M. Inglis at Narhar on March 18th, 1898.

C. rubeculoides, Vig. (Blue-throated Flycatcher).—A scarce cold weather visitor.

Stoparola melanops, Vig. (Verditer Flycatcher).—Not uncommon during the cold weather.

Culicicapa ceylonensis, Swains. (Grey-headed Flycatcher).—Common in mango groves during winter.

Terpsiphone paradisi, Linn. (Indian Paradise Flycatcher).—Very common. Breeds in April in mango groves. Four is the full complement of eggs laid by this bird.

Hypothymis azurea, Bodd. (Indian Black-naped Flycatcher).—I have only one specimen in my collection. It is not a common bird, keeping to well-wooded parts.

Rhipidura albifrontata, Frankl. (White-browed Fantail Flycatcher).—Very common in mango groves. Breeds in April and May. This bird has a habit of spreading out its tail when alighting on a tree.

Pratincola caprata, Linn. (Pied Bush-Chat).—Common during the cold weather among thick grasses and sugar-cane,

P. maura, Pall. (Common Indian Bush-Chat).—Very common during the cold weather. Affects the same situations as the last.

P. leucura, Blyth (White-tailed Bush-Chat).—I never saw this bird myself, but my friend Mr. C. M. Inglis writes that he saw a bird at Nashar, which he took to be this species.

Ruticilla rufiventris, Vieill. (Indian Redstart).—A common cold weather visitor, arriving in October, and departing again in March.

Cyanecula suecica, Linn. (Red Spotted Blue-throat).—This bird is very common during the cold weather among sugar-cane and tall grasses. It usually arrives about the end of September.

Calliope camtschatkensis, Gmel. (Common Ruby-throat).—Two were seen by Mr. Inglis at Narhar.

Copsychus saularis, Linn. (Magpie-Robin).—Extremely common. It breeds in April, May, and June. Five appears to be the full complement of eggs. This bird is much prized by the natives for cages, on account of its sweet song.

Cittocincla macrura, Gmel. (Shama).—One of Mr. Inglis's collectors shot a specimen of this bird at Narhar in February, 1900.

Merula atrigularis, Temm. (Black-throated Ouzel).—I once came across a small flock of these birds at Dalsingh Serai in March, 1900, but was unable to secure any.

Geocichla citrina, Lath. (Orange-headed Ground-Thrush).—A scarce winter visitor. Usually seen in mango groves.

Oreocincla dauma, Lath. (Small-billed Mountain-Thrush).—A pair were shot by Mr. Inglis's collectors at Narhar in March, 1899.

Ploceus baya, Blyth (Baya).—Common. Breeds during the rains, making a large hanging nest. Most of the nests I have taken were hung on palm trees, but I have seen them on mimosa and sisoo trees. Two is the full complement of eggs.

P. bengalensis, Linn. (Black-throated Weaver-Bird).—Common, but not quite as common as *P. baya*. They build in rushes and long grass, breeding in June, July, August, and September.

Munia atricapilla, Vieill. (Chestnut-bellied Munia).—Found commonly in July and August.

Uroloncha malabarica, Linn. (White-throated Munia).—Very common on waste lands in large flocks. It breeds in every month except January and June.

U. punctulata, Linn. (Spotted Munia).—I have always found this the rarest of the Munias. It breeds in March, July, August, September, and November.

Sporæginthus amandava, Linn. (Indian Red Munia).—Fairly common. Found breeding in July, August, and October.

Carpodacus erythrinus, Pall. (Common Rose-Finch).—I saw two in the possession of a birdcatcher, who told me he had caught them in the district.

Gymnorhis flavigollis, Frankl. (Yellow-throated Sparrow).—I have only one specimen, shot by one of my collectors.

Passer domesticus, Linn. (House-Sparrow).—Extremely common. Breeds almost anywhere nearly throughout the year.

Cotile sinensis, Gray (Indian Sand-Martin).—Very common. Found breeding in January, April, and November.

Hirundo rustica, Linn. (Swallow).—A common cold weather migrant, often staying well on into summer. First arrivals noticed in September.

H. nepalensis, Hodgs. (Striated Swallow).—Several times noticed in company with *H. rustica* and *C. sinensis*.

Motacilla alba, Linn. (White Wagtail).—A common cold weather visitor, seen everywhere.

M. leucopsis, Gould (White-faced Wagtail).—Common.

M. personata, Gould (Masked Wagtail).

M. hodgsoni, Gray (Hodgson's Pied Wagtail).—Very common.

M. maderaspatensis, Gmel. (Large Pied Wagtail).—Very common. Commences nesting in June.

M. borealis, Sundev. (Grey-headed Wagtail).—A cold weather migrant.

M. flava, Linn. (Blue-headed Wagtail).—A common cold weather visitor. Arrives first in October.

M. beema, Sykes (Indian Blue-headed Wagtail).—Very common, and often confounded with the last.

M. citreola, Pall. (Yellow-headed Wagtail).—Not very common. Arrives first in October.

Anthus maculatus, Hodgs. (Indian Tree-Pipit).—Exceedingly common during the cold weather, and much sought after by

native birdcatchers, who, with these birds and the Short-toed Lark, sell to Europeans as "Ortolans." These Pipits assemble in large flocks, usually in mango groves, or under the shade of any large tree.

A. rufulus, Vieill. (Indian Meadow-Pipit).—A very common resident. Breeds in March, April, and May. A nest found by myself was situated under a clod of earth. The nest was composed of grass, and contained four eggs.

Calandrella brachydactyla, Leisl. (Short-toed Lark).—A common winter visitor, appearing in rice-fields in enormous flocks. This bird is also caught under the name of "Ortolan."

Alaudula raytal, Buch. Ham. (Ganges Sand-Lark).—Common on the banks of large rivers.

Alauda gulgula, Frankl. (Indian Sky-Lark).—I have not found this bird at all common. Its song is not so long or melodious as the European Lark.

Mirafra assamica, McClell. (Bengal Bush-Lark).—Very common. Numbers noticed in April, May, and June. A nest I took was placed on the ground, and contained four eggs.

Galerita cristata, Linn. (Crested Lark).—Very common on waste and grassy lands.

Pyrrhulauda grisea, Scop. (Ashy-crowned Finch-Lark).—Very common on waste and grassy lands. It has a curious habit of rising a few feet from the ground, uttering the while a curious mournful whistle. They are very tame, and will let one get within a few feet of them before taking wing.

Arachnechthra asiatica, Lath. (Purple Sun-bird).—Common. Breeds throughout the district in February, March, April, and May. It builds a hanging nest placed in a variety of situations, as a rule on trees and shrubs, and rarely under the eaves of houses.

Dicæum erythrorhynchus, Lath. (Tickell's Flower-pecker).—Very common, keeping to the tops of high trees and on flowering shrubs. I have never found its nest.

Piprisoma squalidum, Burt. (Thick-billed Flower-pecker).—Common. Breeds in March, April, May, and June, making a very neat purse-shaped nest, as a rule built on mango trees. Three is the full complement of eggs.

Liopicus mahrattensis, Lath. (Yellow-fronted Pied Wood-

pecker).—I have never found this bird common, and have very few specimens.

Iyngipicus hardwickii, Jerd. (Indian Pigmy Woodpecker).—Not uncommon among mango groves.

Micropternus phœocephps, Blyth (Rufous Woodpecker).—I have only seen two specimens of this bird during the four years I was collecting.

Brachypterus aurantius, Linn. (Golden-backed Woodpecker). This is by far the commonest Woodpecker in the district, and its curious cry is heard in nearly every mango grove. Breeds in March, April, May, and June, and I once found a nest in July. Three is the full complement of eggs.

Lynx torquilla, Linn. (Wryneck).—An uncommon cold weather visitor. I have only once seen it, and one specimen was shot by one of my collectors.

Thereiceryx zeylonicus, Gmel. (Common Indian Green Barbet).—Very common. Breeds in April, May, and June. One nest I found at Dalsingh Serai in June contained three newly-hatched young. The nest was in a hole in the branch of a pepul tree a few feet from the ground.

Xantholæma hæmatocephala, Müll. (Crimson-breasted Barbet). Very common. Its monotonous cry of "tok tok tok" is heard as soon as the warm days set in, and is kept up from morning to night without ceasing. They breed in February, March, and April. I watched one making a nest-hole in an acacia tree in February, 1900, but unfortunately before the nest was finished one of the birds was killed by flying against a window. Another bird I watched was hollowing a hole in a bamboo.

Coracias indica, Linn. (Indian Roller).—Common throughout the district. Breeds in March, April, May, and June. A nest found in April contained two young. Three is the usual number of eggs, though I have taken four on one occasion.

Merops viridis, Linn. (Common Green Bee-eater).—Very common. Breeds in March, April, and May. Three to four is the usual number of eggs.

M. philippinus, Linn. (Blue-tailed Bee-eater).—Not so common as *M. viridis*, but nevertheless found in considerable numbers in some places. Though it is a resident, its numbers are greatly increased during the hot weather by migrants. It breeds

in large numbers in holes of sand-banks near water. These birds have a habit of soaring with wings almost motionless during the evenings. I have watched them several times doing this, for what purpose I cannot say, as they never caught any insects at the time.

Ceryle varia, Strickl. (Pied Kingfisher).—This is the commonest Kingfisher found here, and is seen hovering over nearly every piece of water. In December, 1897, I found a nest in the hole of a bank of a river containing three half-fledged young.

Alcedo ispida, Linn. (Common Kingfisher).—Very common during the cold weather, but I do not think they remain to build anywhere in the district, as I never heard of a nest, though I took special pains to find one.

Pelargopsis gurial, Pears. (Brown-headed Stork-billed Kingfisher).—This I have always found a somewhat scarce bird. It feeds chiefly on fish, but Mr. Stuart Baker mentions that he once saw one devouring a nest of young Mynahs. They have a curious habit, when sitting, of constantly jerking the head from side to side. Their cry may be described as a mournful wail.

Halcyon smyrnensis, Linn. (White-breasted Kingfisher).—An uncommon bird, and very difficult to shoot on account of their extreme wariness.

H. pileata, Bodd. (Black-capped Kingfisher).—A fine male of this rare species was shot by me at Dalsingh Serai on Feb. 25th, 1900. It was sitting on a bamboo near the river. The stomach contained the remains of some fish and beetles, the latter being undigested. As far as is known, this is the first example of the species procured or seen in this district. The skin is now in Mr. Inglis's collection.

Lophoceros birostris, Scop. (Common Grey Hornbill).—Fairly common. Their food seems to consist of fruit, they being especially fond of the fruit of the pepul tree (*Ficus religiosa*). A nest was found by Mr. Inglis in a cotton tree (*Bombax*).

Upupa epops, Linn. (European Hoopoe).—Very common during winter. This and the next species very probably interbreed.

U. indica, Reich. (Indian Hoopoe).—A common resident. A pair nested in March this year (1901) in a bungalow near Darbhanga, and hatched out all the young. They will at once desert

the nest if they have the least suspicion it has been touched, as I have more than once found when a pair were nesting, and on putting in my hand to feel for eggs, though the birds had not laid, they deserted. It is curious how few nests are come across, considering how common the bird is.

Cypselus melba, Linn. (Alpine Swift).—I have several times seen these birds, but was unable to shoot any.

C. affinis, Gray (Common Indian Swift).—Common everywhere.

Tachornis batassiensis, Gray (Palm Swift).—Very common. Breeds nearly throughout the year on palm trees. Three is the full complement of eggs.

Chætura sp.?.—Mr. Inglis writes:—"On the evening of Aug. 26th, 1897, I saw from twelve to fifteen Spinetails flying over Janiagar in a northerly direction."

Caprimulgus macrurus, Horsf. (Horsfield's Nightjar).—Often seen in the cold weather.

C. asiaticus, Lath. (Common Indian Nightjar).—I have only twice shot this species. This bird has a curious note, like the sound ice makes when a stone is thrown along it.

Cuculus micropterus, Gould (Indian Cuckoo).—More often heard than seen. Its cry resembles the words, "Make more pekoe."

C. canorus, Linn. (European Cuckoo).—I once saw this species sitting on some railings at Dalsingh Serai in March, 1900. There was no mistaking the species, as it was uttering its familiar cry at the time I saw it.

Hierococcyx varius, Vahl. (Common Hawk-Cuckoo).—Very common and very noisy during the hot weather, but silent during winter. This is the hated "Brain-fever Bird" of Europeans in India, as its cry is said to resemble the words "brain-fever."

Coccycites jacobinus, Bodd. (Pied Crested Cuckoo).—A common summer migrant, arriving in May.

Eudnamys honorata, Linn. (Indian Koël).—Very common during the hot weather and monsoon. It lays its eggs in the nests of the House-Crows. Its food consists of fruit and birds' eggs.

Taccocua leschenaulti, Less. (Sirkeer Cuckoo).—This is not a very common bird, and perhaps often overlooked on account of

its skulking habits. It breeds in April and May, making a big nest of grass. Three is the full complement of eggs.

Centropus sinensis, Steph. (Common Coucal).—Very common in long grasses and among bamboos. It commences nesting in May, building a large globular nest of grass. Three is the full complement of eggs laid. The call of this bird resembles the words "puss puss," uttered in a very deep tone.

C. bengalensis, Gmel. (Lesser Coucal).—I have myself never come across this species, but Mr. Inglis's collectors shot a pair at Narhar.

Palaeornis nepalensis, Hodgs. (Large Indian Paroquet).—I have only on two occasions seen small flocks of this bird.

P. torquatus, Bodd. (Rose-ringed Paroquet).—This is the commonest Paroquet found in this district. It breeds in March, April, and May. They are very destructive to native crops, especially millet, which they carry off wholesale. A number were found breeding in a big cotton tree in May.

P. cyanocephalus, Linn. (Western Blossom-headed Paroquet). This species is fairly common.

Strix flammea, Linn. (Barn-Owl).—A rare bird in this district. I have two specimens in my collection shot at Jainagar. A pair were seen in an outhouse at Hattowrie Factory, Darbhanga, in May, 1901. One egg was taken from the nest, which consisted of a heap of ejected pellets.

S. candida, Tickell (Grass-Owl).—I have once or twice flushed this species from big grass jungle, and on one occasion found their young.

Syrnium ocellatum, Less. (Mottled Wood-Owl).—This fine species is rare. I shot one near Darbhanga in December, 1900, and have seen one or two others. From their castings I have examined, their food seems to consist only of small rodents.

Scops giu, Linn. (Scops Owl).—Mr. Inglis's collectors shot one specimen in immature plumage.

Athene brama, Temm. (Spotted Owlet).—This little Owl is very common, and several pairs are nearly always to be found in any large tree. They are very quarrelsome, always fighting among themselves, and making a considerable noise both day and night. I once watched the courtship of a pair of them. During this time the male bird was most attentive to the female,

and kept feeding her on large beetles. The process of eating the beetles was effected in this manner : The female would throw back her head, and, after two or three gulps, the beetle would be swallowed. She would then shake her tail and shut her eyes with evident satisfaction. A pair of these Owls some years ago built their nest in the thatch of the house here. For some reason or other one of them took a violent dislike to my father, and as soon as he showed himself outside the door, down would pounce the Owl, and commence a vigorous attack on his head ; and on one occasion, whilst he was sitting with other people in the garden, the Owl lifted the cap from off his head. From the castings I have examined, their food seems to consist of insects and bats, and on one occasion I found in one nest a half-grown rat. A nest I found in an outhouse contained three young birds and one fresh egg. I took the young away, together with the parent bird, which was caught on the nest. I kept her for a day, and then released her. About a month after three fresh eggs were found in the same nest, but whether they were laid by the same bird is not certain, though I think it very probable they were.

Ninox scutulata, Raffl. (Brown Hawk Owl). — Mr. Inglis writes :—“ Very rare. A single specimen procured at Jainagar.”

Asio accipitrinus, Pall. (Short-eared Owl).—I have only one specimen in my collection, given me by Mr. Inglis.

Pandion haliaetus, Linn. (Osprey).—A common cold weather migrant.

Otogyps calvus, Scop. (Black Vulture).—Very common. Lays one large white egg. Nest situated in high trees. I once found a nest in January.

Pseudogyps bengalensis, Gmel. (Indian White-backed Vulture).—Common. Breeds in November, December, and January.

Neophron ginginianus, Lath. (Small White Scavenger Vulture). Very common. Breeds in February, March, April, and May. A nest I found in April contained two newly-hatched young. The nest was a large mass of sticks placed at the top of a high pepul tree (*Ficus religiosa*).

Aquila hastata, Less. (Small Indian Spotted Eagle).—A young bird of this species was procured by Mr. Inglis at Jainagar in August, 1899.

Spilornis cheela, Lath. (Crested Serpent-Eagle).—I shot a male of this species out of a pair in July, 1900, at Dalsingh Serai.

Butastur teesa, Frankl. (White-eyed Buzzard-Eagle).—Very common. Breeds in April and May.

Haliaëtus leucoryphus, Pall. (Pallas's Fishing Eagle).—Fairly common. It breeds in November, making a large nest of sticks at the top of some lofty tree.

Polioaëtus ichthyaëtus, Horsf. (Large Grey-headed Fishing Eagle).—Very common. These Eagles are a great nuisance to one when out shooting duck, as any bird that happens to fall dead some way from the boat is at once seized and carried off. They breed in November, December, and January. Two is the full complement of eggs.

Haliastur indus, Bodd. (Brahminy Kite).—Abundant everywhere. It nests in February, March, and April. The cry of this Kite resembles the bleating of a sheep.

Milvus govinda, Sykes (Common Pariah Kite).—Very common. Breeds in February, March, and April on trees and roofs of houses.

Elanus cæruleus, Desf. (Black-winged Kite).—This I have always found a somewhat scarce bird. It nests in July, September, October, November, and January. The nest is usually built in mango trees. One of these Kites killed and carried off a House-Pigeon, which is, I think, a good weight for it to carry, as the Pigeon was quite as large as the Kite.

Circus macrurus, Gmel. (Pale Harrier).—Often noticed during the cold weather.

C. melanoleucus, Forst. (Pied Harrier).—Very common during winter, frequenting heavy grass jungle.

C. cyaneus, Linn. (Hen-Harrier).—A Harrier, which I am sure was this species, was seen by me in January, 1901.

C. æruginosus, Linn. (Marsh-Harrier).—A very common winter visitor. Usually arrives about September. One I dissected had the remains of a frog and some crickets in its stomach, and Mr. Inglis informs me he once found a half-digested *Palæornis cyanocephalus* in one he dissected.

Falco jugger, Gray (Laggar Falcon).—I only once saw a pair of these birds.

F. peregrinus, Tunst. (Peregrine Falcon).—I once saw this bird at Dalsingh Serai in January, 1901. It was hovering over an oat-field.

F. peregrinator, Sundev. (Sháhin Falcon).—Mr. Inglis writes : “ On the 22nd of December, 1899, I saw a Falcon sitting on a pepul tree near Hattiahi ; it appeared to be this species. A Falcon with very dark-coloured back flew past the Nashar bungalow ; it was flying very fast and low. I couldn’t see its lower plumage, but, on account of the very dark colour above, I think it was this species.”

Æsalon chicquera, Daud. (Red-headed Merlin).—Rare. I have a single male in my collection.

Tinnunculus alaudarius, Gmel. (Kestrel).—A very common cold weather visitor, arriving in October.

Accipiter virgatus, Reinw. (Besra Sparrow-Hawk). — Very common. One specimen I saw had the head white, though the rest of the plumage was of the normal colour.

A. nisus, Linn. (Sparrow-Hawk). — I once shot a specimen of this bird in March, 1898. I never came across another.

Astur badius, Gmel. (Shikra). — Very common, and much prized by native birdcatchers for the purpose of hawking. It breeds in April.

Pernis cristatus, Cuv. (Crested Honey-Buzzard).—Fairly common in well-wooded parts of the district. In June, 1901, I took a nest containing two young. Whilst the boy whom I sent up to take the nest was bringing down the young ones, the old bird kept swooping round his head, uttering a low kind of whistle.

(To be continued.)

THE BLACK-HEADED GULL (*LARUS RIDIBUNDUS*). SOME MODIFICATIONS OF HABITS.

By ROBERT SERVICE.

FOR the most part lacustrine in its nesting habits, the Black-headed Gull is yet by no means unknown as a strictly sea-shore species at the breeding season. One small colony that varies from season to season from sometimes only a dozen pairs to over a hundred pairs has bred annually for many years on one part or another of the grassy salt merses of the Solway to westwards of the Nith estuary.

One season this particular colony had its nests destroyed by a succession of high tides in May, whereupon the birds shifted over the sea-bank to a turnip field, and betwixt the rows of young turnips built fresh nests of sea-wrack brought from tide-marks, and successfully brought off their young. Such modifications of habits are of perennial interest to field ornithologists, and constitute much of the charm attached to the outdoor study of birds.

No other British Gull is so much of a land-bird as this one is, and it appears to me that it is becoming greatly more attached to the land in several respects than it was in by-past years. So far as my own experience goes, it was in the abnormally severe winter of 1878-79 that I first noted these Gulls perched in rows upon house-roofs, or alighting on the streets, or coming to the back gardens and such places for food. Previously this habit was only indulged in by an odd bird or two. Since then it has become quite an everyday thing whenever frost of a few days' duration sets in. And there can be little question that they spend far longer time nowadays upon the pasture fields and amongst the crops, instead of going away to the river-sides, estuaries, and shores, as they once did when nesting-days were over. An older generation looked upon the presence of flocks of these Gulls on far inland pastures as presaging storms and

unsettled weather. One never hears now of their mention in this connection ; rather, their absence would call for comment. Undoubtedly the amount of food—insectivorous and vermiciform—they consume the year round, together, of course, with the astounding increase of the Starling within the last thirty-five to forty years, may be set down as the principal factors that have caused the no less astonishing and remarkable change of habits in the Rook, that has so greatly affected the equanimity of game-preservers. The poor Rooks have been deprived of their natural and rightful share, and have been compelled to try elsewhere for a living at their most pressing time of need, in April and May.

The particular purpose of the present paper is to draw attention to the habit of the Black-headed Gull of catching moths. I first watched them do this in the fine hot and dry summer of 1868. For long subsequent to that year they could only be seen capturing moths on the wing during similar warm summers ; but for at least the last dozen of years these Gulls have regularly and constantly presented this habit. Either from choice or necessity the catching of Lepidoptera after nightfall has become a confirmed annual practice. Formerly we meet, in ornithological literature, with short and fragmentary allusions to this species feeding on the Ghost Moths, picking these from the grass-stems. There seems every reason to believe that moth-catching by this species began with the Ghost Moth. Accurate observers like Blake-Knox and Robert Gray only name Ghost Moths ; if other species were taken they would have been specified. One of the latest present-day notes referring to this habit is in ‘British Birds, their Nests and Eggs’ (vol. vi. p. 73), where Dr. H. O. Forbes says : “In summer feeds on insects, and especially moths, which it hawks on the wing.” That shows how the habit has widened from “Ghost Moths” in particular to “moths” in general.

The habit in question is no mere incidental occurrence confined to a few birds in a restricted locality. It is nightly indulged in by apparently the whole of the birds, and carried on for many a mile around all the breeding colonies in certainly the lowlands of Scotland, south of the Forth and Clyde, and across most of the North of England. Where I have not had personal observation to rely on, I have had the benefit of trustworthy information.

It first becomes widely noticeable as a habit about May 25th, and continues every fine quiet night till about July 20th. After that date, although it does not altogether cease, it appears to be indulged in merely to an individual and rather desultory extent. In the bright gloaming of our northern summer, about the time the last Blackbird lays aside his flute for the night, the Gulls put in a rather sudden appearance, flitting low along the grass, hedgerows, and clumps of shrubs, confining their attentions to such places at first. As the evening wears on they rise higher over the tree-tops and along the woodlands, and for the remainder of the night they frequent these loftier heights, only coming down lower when the night is specially bright, or becomes breezy. So far as I have seen, they take any and every moth they can catch. Early in the evening they can be seen snapping up many easily recognizable species. I have seen them take moths so small as a *Depressaria*. The Gulls capture the moths most dexterously, and it is curious to notice a Gull occasionally make a rush and chase a Bat, probably getting jealous of its moth-catching rival, or perhaps mistaking the flying insectivore for an insect of more than usual dimensions. Standing beneath a tree, over whose top a Gull is gliding, one hears the chuckle of satisfaction emitted when it catches and swallows a victim. Many of the swift-flying *Noctuae* are safe from the Gulls' attentions so long as their usual headlong flight of the early evening continues, but when speed slackens, and they begin to dawdle—as perhaps all the species do in later hours—then the Gulls snap them up continuously.

This moth-catching habit, which has developed so regularly in recent years, occupies, as I have stated, a well-defined period, beginning quite abruptly, and almost to an hour at the same time each season. In various ways, which need not be particularized, I have ascertained with tolerable certainty that throughout the region specified the moths thus caught are for the purpose of feeding the young. No doubt, immature non-breeding birds take part in the pursuit, and apply the proceeds to their own uses, but the main purpose is capture by the breeding birds to feed their young ones.

In this connection I may refer to an excellent paper by Prof. J. Arthur Thomson, M.A., entitled "Some Notes on the Behaviour of Young Gulls artificially hatched and naturally hatched," read

at the recent Glasgow meeting of the British Association. I had the pleasure of listening to this paper, which is printed *in extenso* in the British Association Report for 1901, p. 378. The young Gulls were *L. ridibundus*. Prof. Thomson says:—"They [the newly-hatched Gulls] pecked at the cotton-wool of their beds" (*loc. cit.* p. 379); and further on he says again: "During the first two days they got some of the cotton-wool of their beds into their mouths, but this was inevitable" (p. 380). Why "inevitable"? The Professor evidently attributes this to infantile blundering, but may it not be considerably nearer the mark to suggest that it was due to a longing for the dry fluffy moth-food their hereditary instinct told them they should be provided with? I should have made my suggestion when it occurred to me on the spot, but the formidable row of grey beards and bald heads that clustered round the President of Section D was too awe-inspiring to a mere listener on the back benches.

A further but greatly less marked modification of the habits of this species may also be described here. During those rather infrequent bright and very still days we have in September and October, when insects rise high into the air, Jackdaws and Starlings combine to hunt them, gliding backwards and forwards, Swallow-like, for hours at a time. Always within my recollection such gatherings have occasionally included one or two Black-headed Gulls, but nowadays one never sees them without the Gulls. And the latter may often preponderate in numbers. On such autumn days—days which, it may be said, are invariably characterized by strong migration movements—the principal insect that is being pursued is a large black species of *Chironomus*.

THE CONSTANCY OF THE BEE.

By G. W. BULMAN.

Do Bees keep to one species of flower during a single journey ? There is a general consensus of opinion that they do, as the following quotations show :—

ARISTOTLE.—“ During each flight the Bee does not settle upon flowers of different kinds, but flies, as it were, from violet to violet, and touches no other species till it returns to the hive.”

DOBBS.—“ I have frequently followed a Bee loading the farina, bee-bread, or crude wax on its legs through part of a great field in flower, and on whatever flower it first alighted and gathered the farina, it continued gathering from that kind of flower, and passed over many other species, though very numerous in the field, without alighting on or loading from them, though the flower it chose was much scarcer than the others ; so that, if it began to load from a daisy, it continued loading from the same, neglecting clover, honeysuckle, and the violet.”*

DARWIN.—“ All kinds of Bees and certain other insects usually visit the flowers of the same species as long as they can, before going to another species.”†

H. MÜLLER.—“ The most specialised, and especially the gregarious Bees, have produced great differentiations in colour, which enable them on their journeys to keep to a single species of flower.”‡

LORD AVEBURY.—“ It is a remarkable fact that in most cases Bees confine themselves in each journey to a single species of plant.”§

A. R. WALLACE.—“ Now it has been ascertained by several observers, that many insects, Bees especially, keep to one kind of

* ‘ Phil. Trans.’ 1736.

† ‘ Fertilisation of Plants,’ pp. 415–16.

‡ ‘ Fertilisation of Flowers,’ p. 595.

§ ‘ British Wild Flowers in Relation to Insects,’ p. 26.

flower at a time, visiting hundreds of blossoms in succession, and passing over other species that may be mixed with them."*

FRANK R. CHESHIRE.—"The curious habit of the Apidæ of visiting one kind of flower only during any single excursion."†

R. M. CHRISTY.—"So far as Table I. goes, it will be seen that the Hive-Bee is *perfectly* methodical in its habits."‡

A. W. BENNETT.—"The Diptera exhibit greater constancy [than butterflies], though by no means absolute. A much greater degree of constancy is manifested by the Apidæ, and this becomes all but absolute in the Hive-Bee."§

It is generally agreed that the Hive-Bee exhibits this phenomenon of constancy in the highest degree. In my own experience, the Wild Bees which I have had the opportunity of observing have shown a much greater tendency to pass from one species of flower to another than the Hive-Bee.

The following notes refer to *Apis mellifica* only. Each group of observations was made during one period of watching, extending sometimes to an hour and a half. They were noted in a garden during March of the present year :—

Bee No. 1 goes from *Chionodoxa luciliae* to *Crocus*.

"	2	"	"	"
"	3	"	"	"
"	4	"	<i>Crocus</i> to <i>Chionodoxa luciliae</i> .	"
"	5	"	"	"
"	6	"	"	"
"	7	"	"	"
"	8	"	"	"
"	9	"	"	Snowdrop.

Bee No. 1 goes from *Chionodoxa luciliae* to *Crocus*.

"	2	"	<i>Erythronium dens-canis</i> to <i>Anemone hepatica</i> .
"	3	"	<i>Crocus</i> to <i>Chionodoxa luciliae</i> .
"	4	"	<i>Anemone hepatica</i> to <i>Chionodoxa luciliae</i> .
"	5	"	<i>Crocus</i> to <i>Chionodoxa luciliae</i> .
"	6	"	<i>Anemone hepatica</i> to <i>Chionodoxa luciliae</i> .
"	7	"	<i>Chionodoxa luciliae</i> to <i>Anemone hepatica</i> .
"	8	"	<i>Anemone hepatica</i> to <i>Chionodoxa luciliae</i> .
"	9	"	<i>Crocus</i> to <i>Scilla Sibirica</i> .

* 'Darwinism,' p. 318.

† 'Bees and Bee-keeping,' vol. i. p. 319.

‡ 'Proc. Linn. Soc. Zool.' vol. xvii. p. 186.

§ *Ibid.* p. 184.

Bee No. 1 goes from *Cyclamen Cōum* to *Chionodoxa luciliæ*.

„	2	„	<i>Crocus</i> to <i>Chionodoxa luciliæ</i> .
„	3	„	<i>Scilla Sibirica</i> to <i>Chionodoxa luciliæ</i> .
„	4	„	
„	5	„	<i>Crocus</i> to <i>Chionodoxa luciliæ</i> .
„	6	„	„ „ „
„	7	„	„ „ „
„	8	„	„ „ „

Bee No. 1 goes from *Chionodoxa luciliæ* to *Scilla Sibirica*.

„	2	„	<i>Scilla Sibirica</i> to <i>Chionodoxa luciliæ</i> .
„	3	„	„ „ „
„	4	„	„ „ „
„	5	„	„ „ „
„	6	„	„ „ „
„	7	„	<i>Crocus</i> .
„	8	„	<i>Chionodoxa luciliæ</i> to <i>Viola odorata</i> .

Bee No. 1 goes from *Muscari racemosum* to *Chionodoxa luciliæ*.

„	2	„	<i>Chionodoxa luciliæ</i> to <i>Scilla Sibirica</i> .
„	3	„	<i>Scilla Sibirica</i> to <i>Chionodoxa luciliæ</i> .

Bee No. 1 goes from *Ranunculus Ficaria* to *Viola odorata*.

„	2	„	
„	3	„	<i>Anemone hepatica</i> to <i>Scilla Sibirica</i> .
„	4	„	<i>Scilla Sibirica</i> to <i>Veronica Buxbaumii</i> .
„	5	„	„ <i>Anemone hepatica</i> .
„	6	„	<i>Chionodoxa luciliæ</i> to <i>Scilla Sibirica</i> .

Bee No. 1 goes from *Muscari racemosum* to *Viola odorata*.

„	2	„	<i>Aubrietia Græca</i> to <i>Viola odorata</i> .
„	3	„	<i>Viola odorata</i> to <i>Aubrietia Græca</i> .
„	4	„	<i>Scilla Sibirica</i> to <i>Chionodoxa luciliæ</i> .

ORNITHOLOGICAL NOTES FROM SURREY.

By JOHN A. BUCKNILL, M.A.

At the conclusion of my last contribution upon this subject to the pages of 'The Zoologist' (1901, pp. 247-254), I mentioned that I had received a large number of further valuable notes which I shortly hoped to publish; but, as they turned out to be of a most voluminous character, entailing a great amount of labour in their perusal and examination, I have, until now, been unable to present them in a connected or satisfactory form. The notes comprised the observations and the results of a very exhaustive research upon the Birds of Surrey, compiled by two gentlemen (Messrs. J. M. Mitchell and F. Styan), undertaken and begun about the year 1878, and continued for some years after that date, with the view of a subsequent publication in book form. Owing, however, to various causes arising from the necessities of business, and the permanent residence in China of the latter of these two gentlemen, their labours were never completed, and they have now, with great kindness, placed the whole of their notes at my complete disposal. When I add that these records fill the pages of some dozen or more large note-books; that the authors were well acquainted with some of the older county naturalists (Mr. W. Stafford, of Godalming, and Mr. Mansell, of Farnham, in particular); and that, besides having available to themselves sources to which, for reasons unavoidable (such as death or removal of informants), I had no access, they had left no stone unturned to discover and verify the many occurrences of the rarer visitors to the county which they had had brought to their notice in their work—it will be recognized at once that their contribution to a correct account of the avifauna of Surrey is of considerable importance. Two things strike one at once in perusing and classifying these notes: firstly, the number of records which ten years blot out from even the careful investigator; and, secondly, how very curiously my

records, unearthed a decade later, are corroborated by their earlier notes, often obtained from entirely independent and different sources of information.

In addition to these notes, I have had a number of interesting observations sent to me from both old and new correspondents, and have had the opportunity of examining a small but choice collection belonging to Mr. Barnard Hankey, of Fetcham Park, and these notes I have embodied in the present paper.

I might also add that, during 1901, I contributed a concise list of Surrey Birds to Dent's County Guide to Surrey, and a local list to Gordon Home's little work on 'Epsom.'

It may further be of interest to note that the protection afforded to birds in Surrey has been considerably increased by the repeal of the order of the Secretary of State for the Home Department, dated the 7th of March, 1896, and the substitution of another order dated the 27th of November, 1900. The alteration in this order is the inclusion of the following provision:—

"Section 4.—From the 1st of September to the 31st of January (both days inclusive), the killing or taking of *any wild bird* on *Sunday* is prohibited throughout the County of Surrey, except in the parishes of Little Bookham, Buckland, Burstow, Chessington, Chobham, Cobham, Elstead, Farnham, Puttenham, Reigate, Stoke-next-Guildford, Wallington, and Walton-on-Thames."

This for obvious reasons is an excellent addition to protection, which might, however, have been extended to the whole of the county without the exception of any areas; but, at the same time, some few species might with advantage be deprived of the benefits of this clause, such as the House-Sparrow.

Through the kindness of Mr. Reginald Haines, of Uppingham, I have had the opportunity of looking through a number of letters on ornithology, written by that veteran naturalist, Mr. Waring Kidd, of Godalming, in the sixties. They contain much "Selborne-like" philosophy, but, as was only to be expected, the most interesting letter is not forthcoming. In a letter dated December, 1868, he writes:—"I must leave the account I could give you of our winter visitors for another opportunity; they are almost as interesting to me as the others. Also of the occasional

visitors we have, our *most* rare birds; *they* are not many, but I am sure Mr. Inchbald would like to hear of them—such as the Eagles, Ospreys, Bitterns, Little Bittern—one of the latter only (an exceedingly rare instance)—Hoopoes, Bohemian Chatterer, Roller, Nutcracker, Rose-coloured Ouzel, Oriole, &c.” This promised letter is, unfortunately, not to be found—a sad pity. Details of a local Roller would indeed be a welcome addition to the Surrey avifauna. The other letters, though interesting, do not, with one exception, merit specific mention or quotation. The following are the collected notes:—

MISTLE-THRUSH (*Turdus viscivorus*).—Mr. Dalgliesh noticed on more than one occasion, in the present winter at Milford, a partial albino of this species. The head, tail, and part of the wings were white.

RING-OUZEL (*T. torquatus*).—A party of six were observed near Shalford in October, 1878; a single specimen was observed near Gomshall in the spring of 1879, and another was shot at Chilworth in October, 1880 (F. Styans and J. Mitchell).

BLACK REDSTART (*Ruticilla titys*).—A Mr. Simmons, of Haslemere, owned a specimen, shot about 1830 near that place (F. Styans and J. Mitchell). In a letter dated the 13th of April, 1868, written by Mr. Waring Kidd to Mr. Haines, he says:—“I wonder if you have ever met with the Black Redstart—a winter visitor, although an insectivorous feeder; it is very strange it should arrive here in cold weather. Several of them have been found at Brighton. I have possessed three of them—one obtained at Brighton, one here (Godalming), and one at Harting. All met with in the winter season. The one here, I shot some years ago—thirty or more—in a hop-garden, shaking its tail horizontally, as they all do. It was on the topmost pole, and it puzzled me exceedingly, and being some time in November, and late in the month—too late for the Common Redstart—yet I thought it might be one, and had soiled itself seeking for warmth in some chimney: so I discarded it, which I afterwards regretted very much. It was a female,” &c. (Letter of Mr. Waring Kidd, per Mr. R. Haines.)

DARTFORD WARBLER (*Sylvia undata*).—Mr. J. M. Mitchell observed a pair in a secluded corner of Wandsworth Common for

about five weeks in October and November, 1881. It is interesting to note that this locality was the one in which the presence of this bird in Surrey was first recognized, namely, in 1783. Mr. S. H. le Marchant, of Woking, observed one on Chobham Common in the autumn of 1900 (*in lit.*).

REED-WARBLER (*Acrocephalus streperus*).—Mr. F. Styans found it nesting near Stoke Lock, on the River Wey.

GRASSHOPPER-WARBLER (*Locustella naevia*).—Mr. F. Styans had notes of its nesting in 1880 at Tooting and Redhill.

BEARDED REEDLING (*Panurus biarmicus*).—Mr. G. Dalgliesh, of Milford, informs me that on Aug. 16th, 1894, he observed a party of five at Milford, near Goldalming, upon an alder tree. He is confident of their identity (*in lit.*). If correct, this is a most interesting record; but, although the species has undoubtedly occurred in the locality mentioned many years ago, the absence of any absolute proof of the authenticity of their identification upon this present occasion renders the record not completely satisfactory.

GOLDEN ORIOLE (*Oriolus galbula*).—Mr. F. Yearley preserved a specimen—a female—shot on Ditton Marsh on June 23rd, 1853 (F. Styans and J. Mitchell).

ROSE-COLOURED STARLING (*Pastor roseus*).—Mr. Yearley, Sen., preserved a specimen shot at Thames Ditton in May, 1845 (F. Styans and J. Mitchell).

MAGPIE (*Pica rustica*).—Mr. R. W. Courage, of Thursley (one of Messrs. Styans and Mitchell's numerous correspondents), informed them, in 1880, that the species in former years was quite abundant near Thursley. Mr. Styans, who at that date regarded it as already rare in the Guildford district, found it then nesting at Haslemere; and on May 21st, 1882, Mr. J. M. Mitchell found a nest at Woking. Mr. W. L. Distant (the Editor of this Journal) has courteously informed me that a pair with their young were observed in the spring of 1900 near Upper Warlingham (*in lit.*). Mr. Garland, of Sidlow, states that it is sometimes seen near that place, where it still breeds (C. E. Salmon, *in lit.*).

HOODED CROW (*Corvus cornix*).—Has been noticed on Chobham Common (S. H. le Marchant, *in lit.*). One was shot in December, 1901, at Sidlow (C. E. Salmon, *in lit.*).

WOODCHAT SHRIKE (*Lanius pomeranus*).—A female was shot at Winterdown, Esher, on May 7th, 1853, and preserved by Mr. Yearley (F. Styans and J. Mitchell).

WAXWING (*Ampelis garrulus*).—A specimen was seen at Windlesham in 1886. It is mentioned in a book called 'The Forest of Windsor,' by G. C. Hughes (S. H. le Marchant, *in lit.*).

HAWFINCH (*Coccothraustes vulgaris*).—Mr. F. Styans had notes of its nest from the Hogsback, Sutton Place near Guildford, and Haslemere—all in about 1880. It nests annually near Lingfield, and in 1894 there were three nests in one orchard (F. H. Birley, *in lit.*). Mr. Dalgliesh has recent specimens from Guildford (*in lit.*). In 1899 nests were taken on Thornton Heath and Streatham Common (Ward Adeney, *in lit.*). Notwithstanding the extensive building operations taking place in Epsom, the species still frequents some quiet gardens there.

GOLDFINCH (*Carduelis elegans*).—Mr. F. H. Birley considers it to be increasing near Lingfield (*in lit.*).

BRAMBLING (*Fringilla montifringilla*).—Large numbers occurred near Windlesham in 1892 (a good year for this species in Surrey, J.A.B.), and near Chobham in 1900 (S. H. le Marchant, *in lit.*). Mr. J. M. Mitchell, in the spring of 1900 and 1901, saw a pair near Elstead, which he was inclined to believe were nesting, but the nest was not discovered (*in lit.*).

LESSER REDPOLL (*Linota rufescens*).—On July 19th, 1887, Mr. F. H. Birley observed a pair feeding their young at Lingfield (*in lit.*).

TWITE (*L. flavirostris*).—Mr. F. Yearley preserved a specimen shot on Dec. 10th, 1868, at West Molesey (F. Styans and J. Mitchell).

CROSSBILL (*Loxia curvirostra*).—Mr. F. Styans had notes of its occurrence in some numbers about 1880 near Guildford and Haslemere. Mr. F. H. Birley informs me that there were a great many at Lingfield in the winter of 1898–9, and that some few stayed till May (*in lit.*). Mr. Dalgliesh has a male from Guildford, taken this winter (*in lit.*).

CIRL BUNTING (*Emberiza cirlus*).—Mr. F. Styans knew of a nest and two eggs, taken on July 20th, 1873, in Gatton Park, which were recorded in the 'Proceedings' of the Croydon Natural History Society, 1879, p. 35; and of another nest and

eggs, taken at Woodcote, near Croydon, on July 15th, 1878. Mr. F. H. Birley found a nest with eggs in a garden near Reigate Heath in 1887, and another, also with eggs, in the same place in 1890 (*in lit.*).

GREY WAGTAIL (*Motacilla melanope*).—Mr. S. H. le Marchant informs me that he has often observed this species in winter near Chobham (*in lit.*). In July, 1901, a pair were constantly observed feeding one young bird near Farnham; they were most carefully identified (C. H. T. Whitehead, *in lit.*).

YELLOW WAGTAIL (*M. raii*).—Mr. S. H. le Marchant has found it nesting at Chobham (*in lit.*).

GREAT SPOTTED WOODPECKER (*Dendrocopos major*).—Mr. F. Styan found a nest with eggs in a large alder on the Wey, near Stoke Lock, in 1879. Mr. S. H. le Marchant often observes the species near Chobham (*in lit.*), and Mr. Dalgliesh has a male, shot this winter at Guildford (*in lit.*).

LESSER SPOTTED WOODPECKER (*D. minor*).—Mr. F. Styan knew of a nest at Egham in 1881. It was observed at Deepdene, Dorking, in December of 1899 by Mr. Harold Russell (*in lit.*). It also nests regularly at Chobham Place, where it may often be observed (S. H. le Marchant, *in lit.*). It has also nested recently (1901) at Sidlow (C. E. Salmon, *in lit.*).

KINGFISHER (*Alcedo ispida*).—Mr. J. M. Mitchell took a nest and five eggs at Balham in June, 1879. Mr. F. H. Birley informs me that it nests annually on the upper part of the little stream which eventually forms the water-jump on Lingfield race-course (*in lit.*). Mr. Dalgliesh considers that it is on the increase near Milford (*in lit.*).

HOOPOE (*Upupa epops*).—Mr. F. Yearley preserved four, shot in the neighbourhood of Claremont between the years 1850–60, one of which was killed at Claygate in July of 1859 (F. Styan and J. Mitchell). Two of the other three may well be identical with two specimens which I mention in the ‘Birds of Surrey’ (p. 165) as having been obtained on Barnes Common in 1854, and at Esher in 1855. The third appears to be a new record (J. A. Bucknill). In Mr. G. C. Hughes’s ‘Forest of Windsor’ it is stated that one was seen at Sunningdale Station, just inside the Surrey boundary, but no date is given (S. H. le Marchant, *in lit.*). In the ‘Field.’

LONG-EARED OWL (*Asio otus*).—Mr. F. Styans had the following notes on this species not hitherto recorded by me:—

1. A nest at Witley in 1863, from which a nestling was taken and reared (*fide* Bryan Hook).
2. A nest with five eggs, taken on Reigate Hill on March 28th, 1874 (*fide* J. B. Crosfield).
3. A partly fledged bird, captured near Boxhill on June 5th, 1876 (*ib.*).
4. A nest with eggs near Churt in 1881 (*fide* Bryan Hook).
5. Found nesting about 1882 at Thursley, where it occasionally bred (*fide* R. W. Courage).

Mr. S. H. le Marchant informs me that he observed a pair at Chobham about 1897, which were probably nesting (*in lit.*). Mr. G. Dalgliesh has a male, taken this winter at Farley Heath, near Albury (*in lit.*).

HEN-HARRIER (*Circus cyaneus*).—A female was shot at Wisley in December, 1869, and preserved by Mr. F. Yearley; an immature female was shot on Jan. 20th, 1880, by a Mr. H. Bucknall, near Banstead, and was preserved; Mr. R. W. Courage had a male in his collection, shot near Thursley, and stated (in 1880) that it had been also known to occur there in spring (F. Styans and J. Mitchell).

MONTAGU'S HARRIER (*C. cineraceus*).—Mr. Stafford, of Godalming, informed Mr. F. Styans that the specimen in his (now the Charterhouse) collection was found dead (as mentioned in my 'Birds of Surrey,' p. 179) by the side of its nest on Royal Common. The nest contained four eggs. As this occurrence was so long ago as 1840, and as the species has been killed or observed more than once in the same spot, the story may well be true.

COMMON BUZZARD (*Buteo vulgaris*).—Mr. Stafford gave 1851 as the date when the pair in the Charterhouse collection, "killed whilst nesting at Witley," referred to in my 'Birds of Surrey' (p. 181), were taken. He also stated that the birds had nested there three years in succession, and that the young had been taken and successfully reared by the master of Witley Workhouse. An idea, however, grew up that the birds did damage to chickens, and they were therefore shot. Mr. R. W. Courage, in 1880, informed Mr. F. Styans that the species had been known to occur near Thursley (F. Styans and J. Mitchell). In November of 1901

a specimen was trapped by Mr. Cosmo Bonsor's keeper at Kingswood Warren. It passed into the possession of Mr. H. Skilton, of Epsom, and was preserved by Mr. Anstiss, of London.

ROUGH-LEGGED BUZZARD (*B. lagopus*).—Mr. J. M. Mitchell saw in the flesh a very fine male of this species, which had been shot near Croydon in the late winter of 1879 (F. Styan and J. Mitchell).

WHITE-TAILED EAGLE (*Haliaëtus albicilla*).—In November of 1876 Mr. H. S. Styan, whilst fishing on Virginia Water, saw two birds of this species wheeling round and over the surface of the lake. Mr. Keene, the local fisherman, who was with Mr. Styan at the time, informed him that in the first place, about the end of October, three of these birds had appeared in Windsor Park. One had been caught in a trap baited with fish, and presented to H.R.H. Prince Christian. Orders had been given to the keepers not to shoot or destroy the other two, but, if possible, to capture them alive; the attempts made to do so were, however, unsuccessful, and they remained in the district for some time. They were sometimes seen to attack the wildfowl on the lake (F. Styan and J. Mitchell).

RED KITE (*Milvus ictinus*).—Mr. F. Styan saw a female in Mr. W. Stafford's collection in 1880, which Mr. Stafford then informed him had been killed near Godalming in March of 1870. Whether Stafford's story to Mr. Styan is correct or not, it is, of course, now impossible to say, but the specimen was not in his collection in 1884, and I am unable to trace the specimen in any way (J. A. Bucknill). Mr. F. Styan was also informed by a Mr. F. Roberts, of Haslemere, that a pair frequented Hindhead very many years before 1880—a not improbable though unsubstantiated story. I have myself heard a similar rumour from more than one source. I have also been informed by Mr. Luke Humphrey, of Headley, that about 1878 a specimen was caught at Boxhill, and preserved, and kept by the late Sir Richard Glasse, then at High Ashurst, Headley.

PEREGRINE FALCON (*Falco peregrinus*).—In the spring of 1880 a male was shot on Merrow Downs, and identified as a wild bird by Capt. Salvin. Mr. R. W. Courage had a specimen, killed at Thursley in spring, and stated, in 1880, that it had been known to occur there before that date (F. Styan and J. Mitchell).

HOBBY (*F. subbuteo*).—Mr. F. Styán and Mr. J. Mitchell have the following interesting notes on this species, the more valuable because they record the first definite occurrence of the bird nesting in Surrey, although there was not much doubt that such had been the case :—

1. On June 17th, 1873, one was shot at Weybridge, and preserved by Mr. F. Yearley.

2. A pair nested at Normandy Farm, near Wanborough, in 1879. The male was shot, and the young in down taken with the nest; the hen escaped. The male and nestlings were preserved in a group, together with a hen Kestrel, by Bradden, of Guildford. In 1880 another pair nested in the same spot, and safely reared their young; but in the autumn a mature female, supposed to be the mother bird, was shot there, and cased with the previous lot, replacing the hen Kestrel. The group was eventually purchased by a Mr. Hancock, of Newcastle, to whose residence it was removed (*fide* Capt. Salvin).

3. Mr. R. W. Courage stated, in 1880, that it had been known to occur at Thursley in summer.

A male was shot on Aug. 12th, 1901, in Mr. Herbert Brooks's park at Epsom by his gamekeeper, and preserved by Mr. C. Lisney, of Ashtead. I have seen this specimen (J. A. Bucknill).

MERLIN (*F. æsalon*).—One was shot in the winter of 1880–1 near Guildford, and preserved by Bradden. Mr. R. W. Courage had a specimen in his collection, shot at Thursley, and stated (in 1880) that he had known it occur there on other occasions (F. Styán and J. Mitchell).

(To be continued.)

NOTES AND QUERIES.

MAMMALIA.

Black Variety of Water-Vole.—On May 16th I saw in this neighbourhood a specimen of the black variety of the Water-Vole (*Arvicola amphibius*). It was swimming a short way off when I first saw it, and dived on catching sight of me. The water was clear, and I was able to follow its course until it came to the surface. After swimming a yard or two it dived again, and I saw it no more. I have seen the animal in Scotland, and do not think I could possibly have been mistaken in the identity.—T. VAUGHAN ROBERTS (Nutfield, Watford).

AVES.

Motacilla beema in Sussex.—In this Journal for 1901, p. 389, I recorded an instance of the breeding of the Blue-headed Wagtail near Winchelsea, in this county, and stated, on the authority of Mr. H. E. Dresser, that the birds came nearest to the form described by Sykes as *Motacilla beema*. Shortly afterwards Mr. Ernst Hartert informed me that there was a Wagtail in the Tring Museum which from the first he had assigned to Sykes's subspecies. I have had the privilege of examining this specimen (a male, shot near Rottingdean, April 20th, 1898), and after carefully comparing it with the original description, and with skins of allied forms, I fully agree with Mr. Hartert's identification.—W. RUSKIN BUTTERFIELD (St. Leonards-on-Sea).

White Rook at Aberdeen.—A White Rook (*Corvus frugilegus*) was shot in the Whitehaugh Woods, Alford, Aberdeenshire, on May 21st. This occurred during a raid among the Rooks, which was made in order to keep them within what is believed to be suitable numbers for the district. It is reported that they were not so numerous as in former years, so that it may be assumed that the severe onslaughts which have been made upon them for the last few years have resulted in diminishing their number. It would be well that this were so, and that the annual raids upon them were curtailed, because when the latter were continued for some days and nights in continuation the Rooks took to the surrounding moors, and were eating the eggs of Grouse. Referring to the subject of White Crows, I once saw one which I imagine to have been a Hooded Crow (*Corvus cornix*), as it came from a plantation during a hunt, where in some years these

birds resort in this district, and where there is neither rookery nor Rooks.—W. WILSON (Alford, Aberdeen, N.B.).

Migrants at Aberdeen.—Swallows arrived here on May 15th; Warblers from May 12th to 15th. Cuckoos are few in numbers, and very little heard of them on account of the bad weather; so that the increase of former years has not been maintained. First one heard May 4th, the only one on to May 9th.—W. WILSON (Alford, Aberdeen, N.B.).

The Spring Migration of Swallows.—On Thursday, May 8th of this year, I arrived at Spiez, on the Lake of Thun, Switzerland. Swallows were seen flying over the lake: on the following day they were in greater numbers, busily hawking for food over the surface of the water, and frequently resting on stones at its edge. On Saturday they were in immense numbers all the way between Interlaken and Spiez, at the former place in the evening the steamboat seemed almost to have to cut a passage through their ranks. On Sunday morning, May 11th, no sign of a Swallow was to be seen. Weather all the time was rainy, wind S.E., moderate in force, temperature about 45 degrees Fahr.: tops of the near mountains generally hidden in cloud, and the distant mountains invisible.—T. P. NEWMAN (Hazelhurst, Haslemere, Surrey).

I N S E C T A.

Mole-Cricket in Surrey.—It may interest entomologists to know that on the night of June 3rd I caught a very fine specimen of the Mole-Cricket (*Gryllotalpa vulgaris*). These insects, I believe, are very rare, or else extremely local. I have only one other in my collection, caught at Churt, in the neighbourhood here, some time ago. These are the only two I have ever seen. I have questioned several people about them, and showed them my specimens, and no one seems to have met with the species, and to country people it is quite unknown.—GORDON DALGLIESH (Inglefield, Milford, near Godalming).

[This insect, often known as *Curtilla gryllotalpa* and *Gryllotalpa gryllotalpa*, is stated by Mr. Burr, in his 'British Orthoptera,' to be local in distribution, and found chiefly in the south. Stephens gives Devon, Cornwall, and Ripley. It is to be found in the New Forest, near the Chichester Canal, and at Besselsleigh, in Berkshire. It lives in holes in damp and sandy places, and is also found in potato-fields. Mr. W. F. Kirby informs me that he has heard, or read, that a good way of entrapping males of this species is to throw down water on a gravel path over night, and to lay boards over the place, when the insects may be found under the boards in the morning. The insect is seldom met with, and but few entomologists come across it in the country.—Ed.]

NOTICES OF NEW BOOKS.

The Naturalist on the Thames. By C. J. CORNISH, F.Z.S.
Seeley & Co., Limited.

THE love of the Thames is scarcely confined to Londoners ; it is always the popular river to Englishmen. Its upper waters are best known to the angler and the boating man ; down its course to the sea has travelled from time to time the enterprise of Great Britain. There is an opportunity for a journal to be devoted solely to this river, while a Thames Natural History Society only requires formation for its success to be assured. We therefore gladly welcome Mr. Cornish's contribution to this delightful theme.

Some of the chapters in this book will be familiar to readers of the 'Spectator' and the 'Badminton Magazine,' and some travel a little beyond the strict scope of natural history ; but Mr. Cornish is seldom dull, and always instructive. A river can be studied like a vast aquarium, by those who will use their eyes with persistent method, and the author has given some instances of how this may be done in his chapter on the "Insects of the Thames." Very suggestive, too, is the one devoted to the "Antiquity of River Plants," and their animal frequenters. "The creatures which lived on these prehistoric plants live on them now, and in exactly the same parts of the stream. The same shells lie next the banks in the shallows as lie next the bank of the prehistoric river of two million years ago whose bed is cut through at Hordwell Cliffs on the Solent."

We are glad to find that the efforts for animal preservation made by the Thames Conservancy and various County Councils have been followed with excellent results. The Herons from Richmond Park have extended their usual nightly fishing-ground, which formerly ended at Kew Bridge, four miles further down the river, almost to Hammersmith Bridge, and have even been heard at Chelsea. Since the middle of June, 1890, large shoals of Dace,

Bleak, Roach, and small fry have appeared in all the reaches, from Putney upwards; while Smelts now ascend the Thames as they did before the river was polluted, and are freely caught at Chiswick. We may also hope for the plentiful appearance once more of the Crayfish, whose almost complete destruction was due to a disease, well known in France, which first appeared near Staines, and worked its way up the Thames.

We have heartily enjoyed the perusal of this nicely illustrated book, and trust that it may be the harbinger of other work on the natural history of our well-loved river.

A Treatise on the Birds of Gloucestershire, with a Reference List of all the Species known to have appeared in the County.

By W. L. MELLERSH, M.A. Gloucester: John Bellows. London: R. H. Porter.

COMPARED with most books on county ornithology, this publication is distinctly novel, and written on a different method; the presence or absence of birds in Gloucestershire is discussed more on a philosophical than on a reporter's basis; the geological floor, with its consequent surface flora, is shown to have its influence in the distribution of our avifauna, and we at length feel that there is some reason for the presence of the rare bird that fell to the gun of the faithful recorder. Gloucestershire is thus considered as a dominant partner, and the presence of birds less of a chance occurrence. We are not attempting to spoil a good book by absurd panegyric, but we do recognize that Mr. Mellersh has proposed a philosophical basis for a recognition of even the birds of a single county. To find there is a reason to be adduced on natural causation for the presence of a bird is tantamount to our believing in a purpose running through the ages. We know that causation is often confused with theory by many writers, but the still small voice is yet recognized in biology, despite the discrepancies in rival suggestions. In fact, evolution is slowly becoming an orthodox idea in contradistinction to the theories of specialists and doctrinaires. Science is more concerned with the reason why a bird is in a certain habitat, rather than with the fact that it is there; and that is a question that the author of this book shows is capable of discussion. His enumeration may

or may not be imperfect; his conclusions may or may not be final; but he has contributed an instructive essay on the subject of his county's ornithology, and has inculcated a method which we may hope to see followed in philosophical ornithology.

Moose-Hunting, Salmon-Fishing, and other Sketches of Sport.
By T. R. PATTILLO. Sampson Low, Marston & Co., Limited.

ALTHOUGH this is a volume primarily addressed to the sportsman, it contains very much of interest to the naturalist, and refers to the somewhat little-known fauna of Nova Scotia. We wish the author would write another volume, discarding his shooting and fishing exploits, and giving us only his zoological observations. He has been alone with the animals he has shot and captured, he gives abundant hints of the observations he has made on their habits, and he has almost a responsibility to publish them. In fact, one passes over matter instructive in animal bionomics by being carried away captive to the domain of sport so well and enthusiastically described by Mr. Pattillo. If, however, he is a poor sportsman who is no naturalist, so is he a circumscribed naturalist who has never felt the ardour of the sportsman; and in this spirit the work may be read with advantage by both parties. The last chapter—not the worst in the book—requires supervision. Once more we meet with our old nautical enigma, the "Dolphin." Our readers will probably surmise that the "Dolphin" here referred to is a fish, the well-known *Coryphæna*.

EDITORIAL GLEANINGS.

ONE of the most interesting exhibits at the Conversazione of the Royal Society on May 14th was that made by the Marine Biological Association with reference to the scales of fishes as an index of age. The scales of many fishes show a series of parallel eccentric lines, which indicate successive increments of growth. These lines of growth have been found to be more widely separated in that part of the scale formed during the warm season of the year than in the portion formed during the cold season. The alternation of the two series gives rise to the appearance of "annual rings," which indicate the age of the fish in years. The markings are subject to individual variation, and Mr. J. Stuart Thomson has been engaged on their investigation in fish of different species captured at all seasons of the year. His results show that it is possible to determine the age of individual fishes of many species with considerable precision—a conclusion which will greatly facilitate the study of other points in the natural history of fishes, and has important practical applications.

Lewenhoeck long since observed that from carefully examining the scales of fish through a high magnifier, you may easily ascertain its age, from the first scale to the last, which are never shed.

NATURE's reign of terror at Martinique has affected all animals alike—man and his more humble relatives. We read of a "panic of the dumb animals" in the daily press. Records of previous earthquakes and volcanic eruptions mention that most animals have a sort of premonition of what is going to happen, even when there are no perceptible tremblings, and hasten from the neighbourhood of danger. Such was the case at St. Pierre, it would seem from a 'New York Herald' telegram. The correspondent quoted by the 'Daily Telegraph' says:—"Even before Mont Pelée began to rumble late in April, live stock became uneasy, and at times were almost uncontrollable. Cattle lowed in the night, dogs howled and sought the company of their masters, and when driven forth they gave every evidence of fear. Wild animals disappeared from the vicinity of Mont Pélee. Even snakes, which at ordinary times are found in great numbers near the volcano, crawled

away. Birds ceased singing, and left the trees that shaded the sides of the mountain. A great fear seemed to be upon the island, and though it was shared by human inhabitants, they alone neglected to protect themselves."

We have received the Report of the "Breydon Wild Birds Protection Society" for the seasons 1898-1901. This Society is doing a work that should receive the support of all British ornithologists. It particularly concerns itself with the protection of Spoonbills, which again show a tendency to make a permanent residence at Yarmouth. That this protection is much needed the present writer can testify. Last Eastertime he was shown a specimen, purchased from a London purveyor, and said to have come from Caithness. This locality he at once denied, and further enquiries elicited the new locality "Suffolk." It was doubtless a Breydon bird! It need scarcely be said that the Society requires funds, and to those willing and able to assist, we may give the address where subscriptions will be heartily welcomed:—
HENRY P. FREDERICK, Hon. Sec., 3, South Quay, Great Yarmouth.

We extract the following from the 'Veld,' an excellently illustrated monthly, published at Cape Town:—"Forty years ago whaling was a prosperous industry at the Cape of Good Hope, and several whaling stations, with their boats and crews, were situated all round the peninsula. At Sea Point the fishery was known as Grainger's, and when a certain flag was hoisted on the Lion's Rump it was known that a Whale was in the Bay, and that Grainger was after it. The only survivor of these stations is that at Muizenburg, and the Aurets are now the only regular whalers in these regions; although, should a 'fish' put in an appearance in any of our waters, our fishermen are prepared, at very short notice, to give him a hot time. Year by year the Aurets manage to harpoon an odd Right Whale which has wandered north from his Antarctic fastnesses, and last year, on Sept. 27th, they made a fine capture. After a hard chase and a hot fight in the Bay the Leviathan was landed on the Muizenburg beach, about a mile from the station, and the next morning the process of cutting up began at an early hour. A great number of people came from Cape Town to see the sight, and the Muizenburg beach was quite lively with comers and goers. The Whale-beef—coarse loose flesh—was eagerly carried off by coloured people, who evidently esteem it a dainty. The blubber, which lies immediately under the skin to the depth of ten or twelve inches, was next taken off in long strips, and carried to huge tubs

provided for the purpose. This, when 'tried' or boiled down, furnishes the oil. The most valuable part of the creature is, however, the strainer in its cheeks and throat. This is the whalebone, which nowadays fetches about thirty shillings a pound. At Kalk Bay the folk say that the Whale referred to was worth about £600. It is 45 ft. in length, and the flukes of the tail measured 15 ft. across.

In the 'Wide World Magazine' for May, Mr. C. E. Borchgrevinck contributes an article on "Penguins and their Ways." In our previous volume (p. 192) we gave a notice, with some extracts, of Mr. Borchgrevinck's volume, 'First on the Antarctic Continent,' and the present article supplements the Penguin narrative.

"When we arrived at Victoria Land in the 'Southern Cross,' in February, 1899, only a few Penguins were left, most having gone northwards. We had met them in shoals in the open water, where they jumped about like so many Porpoises round our vessel. Only some stragglers were left on the triangular peninsula at Cape Adare. Not many days after we had landed the last Penguin dived into the sea, and left us to face the stern Antarctic winter alone. Until that memorable Antarctic spring day came, the 14th of October, 1899, no Penguins were to be seen. On that date one lonely old Penguin waddled slowly towards our camp just as the zoologist of the expedition* was dying. That first poor Penguin was also destined to meet death on the date of its arrival, for, at the wish of the dying man in the hut, we killed it, as he wanted to examine it.

"Next day several more Penguins arrived, although there was no open water near the coast. They had evidently walked great distances. Soon a continual stream of Penguins walked towards us from over the immense white expanse; they looked for all the world like so many small people rolling from one side to another, with their flippers outstretched like short arms to maintain their equilibrium. They were not in the least frightened of us. Perchance they took us for a new kind of Penguin! Certain it is that they came up to us, walked round about us, and evidently discussed us—in short, examined us thoroughly—before they again started off on the march towards their breeding-places. It was curious to see how they stuck to their Indian-file method of progression, one always travelling in the step of the preceding one, until long tracks in the snow, winding in and out between the ice-blocks, were to be seen towards Cape Adare.

* Nikolai Hanson.

"The only deviation from these acknowledged tracks was made when one or more of us ten human beings appeared near their road. Then the Penguin who first discovered us, with a hoarse little croak, would break the line and start off towards us. On reaching us he would stop, and gradually all the Penguins would stop behind him, in the same way as railway carriages stop when the engine ahead is pulled up. The first Penguin, having inspected us from one point of view, would start to walk round us, the others gravely following. The first birds, having satisfied their curiosity, started off, joining the main track by a short cut. Looking at them from behind, the contours of their dark backs stood sharply cut out against the white snow. This, in addition to their slow gait, their frequent halts, their grave and unearthly silence while walking in their ordered lines, irresistibly conveyed to the human mind an impression of a Lilliputian funeral procession."

THE Essex Field Club has reached maturity, and its "coming of age" was the subject of an address by its president, Prof. Meldola, of which we have received a copy. As we read:—The actual work accomplished down to the present time will be found in the nineteen volumes of publications; five volumes of 'Transactions' and 'Proceedings,' and, commencing in 1887, eleven volumes of the 'Essex Naturalist,' together with the three volumes of 'Special Memoirs.' It is not only by the number of printed pages, however, that the work will be judged in the future. A study of the contents of these nineteen volumes will show that the Club has on the whole kept faithfully to the programme as set forth in its original rules:—"The investigation of the natural history, geology, and archaeology of the County of Essex (special attention being given to the fauna, flora, geology, and antiquities of Epping Forest); the publication of the results of such investigations, &c."

WE learn from the Report of the Hampstead Scientific Society for the year 1901, that it is hoped that the material for the publication of "The Fauna and Flora of Hampstead and its Neighbourhood" will be sufficiently advanced for the first part to appear in the autumn of 1902. The General Editors are Mr. Basil W. Martin and Dr. J. W. Williams, with the assistance of Messrs. Hugh Findon, Montagu F. Hopson, C. S. Nicholson, the Rev. F. A. Walker, and Mr. James E. Whiting.

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MR. J. C. STEVENS will Sell by Auction, at his Rooms, 38, King Street, Covent Garden, W.C., on *Thursday, June 19th*, at 12.30, the entire Collection of Eggs, Bird Skins, and Ornithological Library belonging to the late Dr. A. C. STARK. The Collection of Eggs (all in clutches) and Skins were all personally collected by Dr. Stark, and authenticated and described by notes taken at the time. It is specially rich in Raptore, including Eggs of **Cinereous Vulture**, **Egyptian Griffin Vulture**, **Bearded Vulture**, **Kite**, **Bonelli's Eagle**, and **Spanish White-shouldered Eagle**. Among others is a fine Series of **Sardinian**, **Dartford**, **Savi's**, **Cetti's**, and **Orphean Warblers**; and a few Good Eggs from North America, collected in 1870–71.

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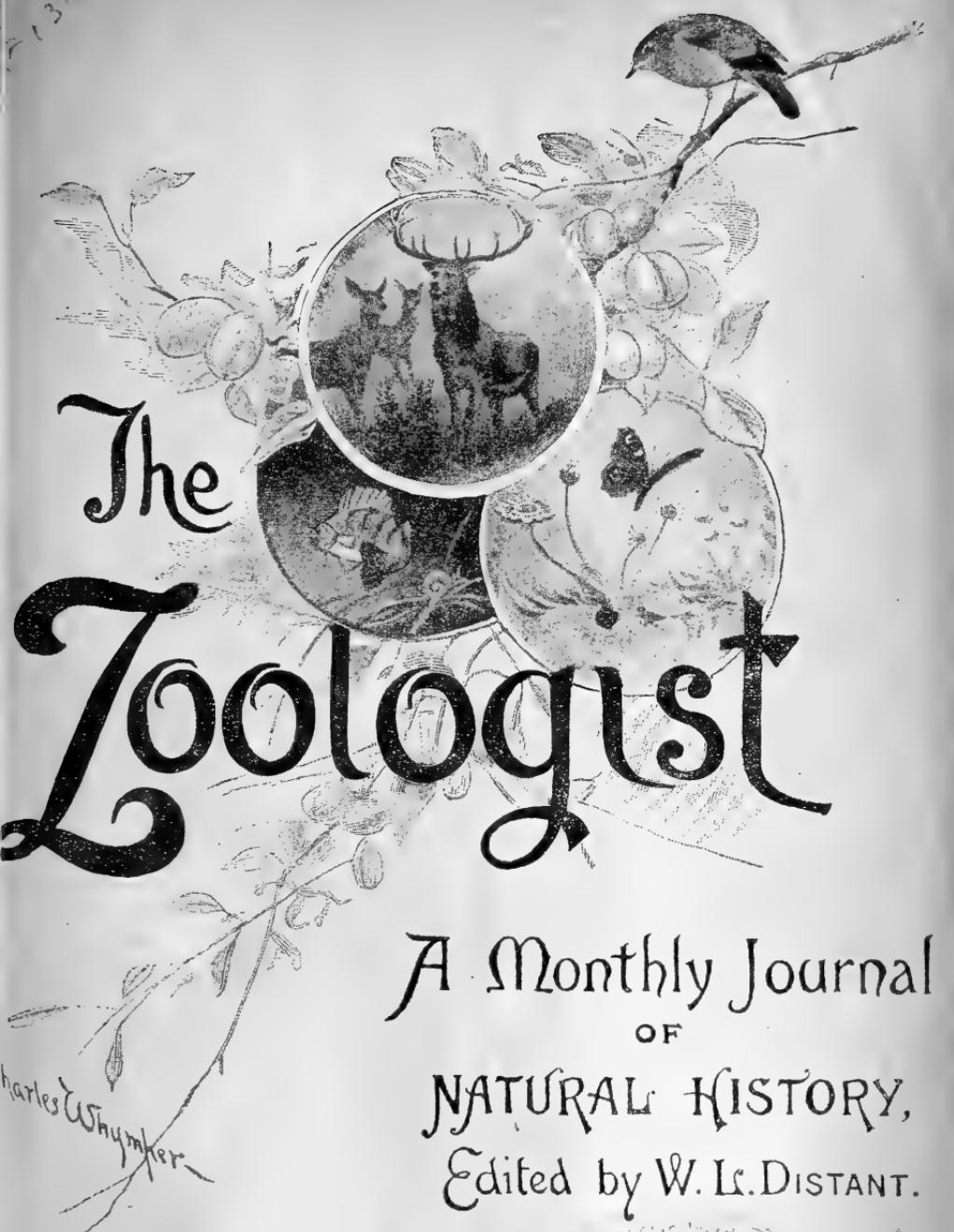
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AVICULTURAL EXPERIENCES DURING ABOUT TWENTY YEARS' STUDY OF BIRDS IN CAPTIVITY.

By ARTHUR G. BUTLER, Ph.D.

It is now about thirty-one years since I first commenced the study of living birds, and about twenty years since I first began to keep them in cage and aviary. During the whole of that time I have striven to make this labour of love useful to ornithologists generally; not only by carefully noting the behaviour of the various species which I have possessed—their postures when courting, their songs, their changes of plumage, and the manner in which those changes were effected, the colouring of their soft parts, their sexual differences, their method of nesting, and the character of their eggs—but I have, I think, conclusively proved that birds, although they undoubtedly are guided by instinct (by which term I understand inherited impressions upon the brain), are nevertheless capable of reasoning, and altering their inherited habit to suit a changed environment. I have also found that a bird, when hand-reared, and constantly in the company of human beings, develops a higher order of intelligence, and consequently is capable of a keener enjoyment of life, than if permitted to grow up a savage.

The postures, bowings, and dances of birds when courting are generally exceedingly comical, and, if birds regarded them from a

human standpoint, they would be better calculated to inspire a feeling of scorn than of admiration in the minds of their mates ; though in some cases, where brilliant colouring is thereby exposed to the feminine eye, admiration might modify the contemptuous feeling.

Among the Thrushes, the cock birds usually approach the hens with outstretched neck, drooping wings, and tail jerked upright. After pairing the cock bird stands straight up, with tail depressed, neck stretched, and bill in a line with the neck, and utters a screaming whistle. I have noticed this in the case both of the American Blue-bird (*Sialia sialis*) and the common Black-bird, the latter being a wild bird, which used to approach its hen upon the roof of my outdoor aviary, which runs parallel to the side of my conservatory.

The dances and postures of the Satin Bower-bird (*Ptilorhynchus violaceus*) are always accompanied by a continuous song, like water escaping down a sink or gully ; even the checks, occasioned by bits of leaf or stick in the water, are admirably rendered. At intervals, when the bird takes a lateral hop, or changes its position, the gurgling and sizzling notes are interrupted by hoarse screaming whistles. The postures are a good deal varied ; a common type is represented by the neck being somewhat retracted, the feathers of the nape and back raised, the tail span-roofed, drooped, the wings lifted alternately, whilst the bird sways from side to side. In another dance the head is stretched forward, the body held high, with all the feathers tightly appressed, but the tail still drooping. A third position is represented by the bird gazing fixedly at its mate, with the bill nearly touching the earth ; the bird often carries a feather, dead leaf, or piece of food in its mouth when going through its performance, and its changes of form and posture are quick and startling.

One thing has astonished me somewhat with regard to this species : I find that both sexes, at different times, indulge in the same performances, both in dancing and singing, and whichever sex happens to be going through its evolutions is a source of terror to the other. As both my birds acquired their very dissimilar adult colouring in September, 1900, there can be no question as to their being genuine male and female.

Touching this acquirement of the colouring which has given to this Bower-bird its very appropriate name, a most astounding statement has been made by the Director of the Zoological Gardens at Melbourne. He asserts "that the birds only come to their full plumage in old age," and that "they die off shortly after the change."* Such an idea is contrary to all our experience of bird-life, and is certainly disproved in the case of those males of the Satin Bower-bird which have assumed their full colouring in England.

In the true Finches (*Fringillidæ*), the methods of subduing the females are very varied ; the Chaffinches and Saffron-Finches (*Fringilla* and *Sycalis*) are very rough wooers ; they sing vociferously, and chase their hens violently, knocking them over in their flight, pursuing and savagely pecking them even on the ground ; but when once the hens become submissive, the males change their tactics, and become for the time model husbands, feeding their wives from the crop, after the fashion of the Serins, and assisting in rearing the young.

Although the hens of Saffron-Finches (*Sycalis flaveola* and *pelzelni*) frequently pursue and peck unpaired cock birds, I do not think they ever kill them, as one cock will often kill another, by tearing back the scalp from the base of the beak ; but I have known a cock *S. flaveola* to kill his wife, who had already brought up two families, because she was disinclined to continue her labours.

The Serins (*Serinus*) seem to depend chiefly upon their song to captivate their brides ; there is often a little chasing and quarrelling on both sides, if the hen is not inclined to undertake marital duties ; as soon as she is, she sits upon a perch quivering or flapping her wings, and with her head thrown backwards. You may notice the same thing with Sparrows and many other Finches after they have once paired ; but the cock Sparrows have a regular dance, with drooped wings and erected tail, which I have observed in no other *Fringillidæ*, though there may be other typical Finches which dance to their mates.

The Buntings chase their partners violently, singing all the while, after the manner of the Saffron-Finches, but without the same spite ; and on more than one occasion I have had males of

* A. T. Campbell's 'Nests and Eggs of Australian Birds,' p. 192, footnote.

Paroaria which, when courting, plucked their breasts nearly bare of feathers ; whether this was to show their bravery, or to offer building materials for the new home, I never could determine ; it certainly did not render them more attractive to me, however it may have struck the hen Cardinals.

Among the Weaving-Finches (*Ploceidæ*) dancing is common, and the attitudes assumed by some of the species when singing and dancing to their mates are very ludicrous. The genera of *Ploceidæ*, if judged by their habits and songs, are strangely commingled in systematic works ; but to the aviculturist they readily sort themselves into the groups known as Waxbills, of which *Estrilda* is the typical genus ; Grass-Finches (= *Amadina*), and many others ; Mannikins, of which *Munia* is typical ; Whydahs = *Vidua* and allies ; and true Weavers—*Ploceus*, *Pyromelana*, &c. The true Waxbills, when showing off and singing, usually take a long grass-stem in their beaks, grasp the perch firmly, look straight upwards, and raise themselves jerkily up and down, uttering a shrill chirp, and finishing with a short song. The Grass-Finches depress the beak when dancing, and frequently sway from side to side ; many of them also hold a long grass-stem in their beaks ; some sing clearly, others almost inaudibly, uttering a weak sibilant song.

The Mannikins behave much like the Grass-Finches, but their tails are spread out fanwise, and they hop sideways, turning from right to left as they approach the hen ; their songs are sometimes clear, but more frequently are a mere weak vibrant humming, with a few creaky notes, and a final prolonged reedy whistle. The Whydahs court hovering, rising and falling with loud beatings of the wings above the perched hen. The action of these birds reminds one forcibly of that of gnats sporting in a swarm ; it is extremely graceful. The song, which is harsh and unpleasant, seems to be chiefly used as a war-cry. By its habits the little Ultramarine Finch (*Hypochera*) is undoubtedly a Whydah with short upper tail-coverts, and is, in my opinion, related to *Vidua hypocherina*. The typical Weavers, although belonging to two groups, separated by scientists under the sub-families *Ploceinæ* and *Viduinæ*, have many peculiarities in common. They depend greatly upon their brilliant plumage, and the expansion of their crests, ruffs, and flank-plumes for attraction

in their courtship ; they nevertheless sing their harsh songs when making this display. The species of *Pyromelæna*, when singing, draw back the head, erect the feathers of the crown, nape, back, rump, upper tail-coverts, and flanks ; indeed, all the feathers on the body seem to be partly erected, greatly adding to the apparent size and beauty of the birds. After the song, having the feathers still extended, they chase the hens with a curious mechanical buzzing flight, such as I have noticed in no other birds.

Among the Starling-like birds, I have been able to make very few observations ; but I believe the Meadow-Starlings show off to their hens upon the wing, flying over, and singing to them. Thus the Red-breasted Marsh-bird (*Leistes superciliösus*), and the Military Troopials (*Trupialis militaris* and *T. defilippii*), are able to exhibit the gorgeous crimson of their under parts, which, when they crouch upon the earth, is almost completely hidden.

I have never kept pairs of any of the Crows ; therefore cannot speak from experience of their courtship ; but this is true also of many other groups. Parrots and Doves make friends with their mates by feeding and caressing them, but the different groups of Doves have various ways of showing off ; the *Columbidæ* bowing very low, with erected expanded tail and drooped wings ; then, lifting the head high, and throwing out the chest, they coo simultaneously. The *Peristeridæ* do much the same thing, the tail opening and shutting like a fan.

The Bar-shouldered Dove (*Geopelia humeralis*) at first bows to his hen, as already described ; but, if she ignores his attentions, he turns his back upon her, raises his head high, spreads his tail downwards so that it sweeps the earth, runs forward with an angry little guttural sound, and looks back at her over his shoulder. If, after doing this about a dozen times, she still takes no notice, he rushes at her in a fury, and commences plucking feathers from her neck and back. The other species of *Geopelia* (*Columbula picui* and *Chamæpelia passerina*) show off in the usual manner ; I have not seen them assume the second offended attitude adopted by *G. humeralis*.

I have never had a hen of the Cape Dove, and the cocks, when by themselves, are singularly apathetic ; so that I have not been able to note the behaviour of this singular looking bird ;

but the Australian Green-winged Dove (*Chalcophaps chrysocloris*), the Bronze-winged Pigeon (*Phaps chalcoptera*), and the Australian Crested Pigeon (*Ocyphaps lophotes*) raise their wings over their backs in front of the erected and spread tail ; as they bow, both tail and flight feathers open and shut, whilst with every action the birds utter a rapid grunting monosyllabic coo. The hen Bronze-wing often mounts the cock bird when pairing, and I supposed at first that this was owing to my male being rather old and afflicted with gouty toes ; but my friend Mr. Seth-Smith tells me that he has seen his birds behave in the same manner.

Wells's Ground-Dove (*Leptoptila wellsi*) behaves exactly in the same way as the *Peristeridæ*, and pairs freely with the Martinican Dove, taking turns with it in sitting on the eggs, but up to July of this year without result, the eggs not being fertile.

The Bleeding-heart Pigeon (*Phlogænas luzonica*) rarely bows to its hen, although I have seen it do so ; it usually races after her at full speed, its head bobbing forwards at each step. As it nears her it stops, depresses its tail, throws out its breast, draws back its head, and utters a smothered coo, rocking backwards and forwards on its feet ; it thus exhibits the beautiful deep crimson-and-rose patch on the breast to perfection. I have also seen it stop suddenly, quiver its wings, and utter a rapid "gu-gu-gu-gu-gu." When the hen Bleeding-heart persistently evades its pursuer, he eventually loses his temper ; and then a new feature is introduced into his wooing. As he still chases her, he claps his wings over his back, making a sharp noise like the loud crack of a whip ; this seems greatly to alarm the hen. I have wondered whether a similar sound produced by our Goatsucker is intended to subdue its mate.

The Nicobar Pigeon (*Calænas nicobarica*) is a singularly surly bird, and I have never seen him make any attempt to woo his mate. All she ever got from him was a savage blow from his powerful wing, or his almost equally powerful bill, accompanied by a deep grunt. He is a great awkward cowardly bird, more like a Guinea-fowl than a Pigeon ; and, but for his brilliant colouring, I do not think many aviculturists would care to keep him.

The songs of birds are not only often overrated, but when represented in words are usually quite unrecognizable. When you come to think of it, there are very few consonants which can be whistled, and, although a singing bird can give some idea of a *t* sound, a *ch*, or a *ph* in his notes, such utterances as *tell* and *spink* are utterly beyond him. In writing down the song of a bird in words, if you wish to convey any idea of the notes to your readers, you should first whistle in imitation of the bird, and then so far as possible write down the notes.

The songs of the Thrushes are capable of endless variation. I doubt if there were ever two Song-Thrushes or two Blackbirds which whistled alike, and yet, as a rule, the songs of these birds, of the Robin, and even of that most accomplished bird, the Mocking-bird (*Mimus polyglottus*), are unmistakable. But if you hand-rear a Blackbird or Thrush, not permitting it to hear its wild song, its notes all go wrong, and either result in a miserable Gregorian chant, or something akin thereto, or to a noisy jangle of sound which is simply appalling. I once had a hand-reared Song-Thrush which had been brought up in a poultry-yard, and subsequently placed in a room where some Canaries were kept. The song was so noisy and penetrating that I gladly sold the bird to a publican, who was wild to secure it. The natural performance of the Song-Thrush is not brilliant, but cheerful and exhilarating; yet I have heard exceptionally gifted Thrushes more than once.

Unless you can place the young of any of the Thrushes where they can hear their natural song, it is a mistake to hand-rear them; my hand-reared Nightingales never sang a note. It is therefore evident that the songs of these birds are not instinctive; they are not handed down from father to son as natural gifts, but are taught as children are taught. But this does not hold true of all birds, unless we believe, as some have asserted, that certain birds learn their parent's song while yet in the egg—a notion which to me seems absurd.

I have found that hand-reared Sky-Larks, however young they may be taken from the nest, sing the wild song perfectly, although they usually add parts of the songs of other birds which they may hear; and I am inclined to believe that the true song-birds, with the exception of the Mocking-bird and one or

two others, rarely learn additional notes after they have become adult. There are notable exceptions to this rule, inasmuch as an Alario Finch (*Alario alario*) which I possessed for some years entirely forgot its melodious little song, and adopted the far less pleasing song of a Norwich Canary; and my Brazilian Hang-nest (*Icterus jamacaii*) has copied to perfection the almost metallic sharp cry of a Blue-bearded Jay (*Cyanocorax cyanopogon*), in addition to his own far more pleasing notes.

Certainly the adult birds which are the best mimics, and are easily taught to talk and imitate the cries of various animals, of trumpets, jews'-harps, and the like, are not to be sought among gifted songsters, but among those whose natural cries are more or less harsh and unpleasing—such as the Parrots, Crows, and Starlings. The capacity of some of the *Psittacidæ* in this respect is practically unlimited. The late Mr. J. Abrahams had a Blue-fronted Amazon which I heard sing the whole of the words of two comic songs, and then whistle the tune of a third—a feat which, I suppose, has never been surpassed even by the best instructed Grey Parrot.

If it were possible—though, unhappily, it rarely is so—the best way to record the songs of birds would be unquestionably by musical notation. My friend Mr. Charles A. Witchell has done much in this direction, but he himself is constrained to admit “that there is no instrument which will automatically reproduce the different tones of birds, and that difference of tone or of timbre is generally more important than difference in musical pitch.” For this reason I think it better for anyone who has a good ear to express the songs of birds as closely as he can in words; but, unless he really has a correct appreciation of sound, it is wiser to let the songs of birds severely alone.

As with the songs, so is it with the call-notes, notes of alarm, or defiance; these are wrongly rendered in hundreds of cases, and are frequently transposed, the note of anger being spoken of as the call-note, or the reverse. These are points that need very careful testing before they are put on record; and an observant aviculturist, who has not only watched birds in their native haunts, but has had them constantly before him in moderately large aviaries, is in a better position to form a correct judgment of the meanings of these notes than the collector.

The colouring of the soft parts in birds can only be studied when the latter are either living or recently dead. The skins in collections give no idea of them, and stuffed specimens, based upon incorrect information, sometimes entirely misrepresent them. Here the aviculturist can greatly assist the cabinet naturalist or the taxidermist, if these men will accept his statements in good faith ; and in this respect my late colleague, Dr. R. Bowdler Sharpe, showed a right scientific feeling, in that he was always glad of any facts I could give him respecting the colouring of the beaks, irides, naked face-patches, and feet of species in my possession.

To cite a few instances in which errors have occurred may perhaps be useful. The Spectacled Thrush (*Trochalopterum canorum*) is so called because the eye is enclosed in a lozenge-shaped ashy-grey naked patch ; yet this very characteristic feature is omitted from descriptions taken from the dried skins. The colouring of the iris in the common Jay has been systematically stated to be brown in young birds, but blue in adults ; whereas the young birds have the iris blue, and the adults vinous brown. The soft parts of *Icterus jamacaii* (the Brazilian Hang-nest) are thus described : " Bill black, at the base plumbeous ; feet black " ; the iris not being noted. In life the bill is very dark slate-coloured, the lower mandible with the basal half ashy whitish ; the iris very pale amber (or transparent primrose) ; the eye enclosed in an elongate subpyriform bluish-ashy naked patch ; feet black. The soft parts of *Acridotheres cristatellus* are not quite correctly described, for this Crested Mynah is said to have the " bill pale yellow, with the base rose-coloured ; feet orange-red ; iris orange-yellow " ; whereas in life the bill is bone whitish, pinkish at the base ; feet ochre-yellow ; iris orange. The soft parts of the Passerine Dove have been variously described, and it seems possible that there may be more than one species confounded under the name of *Chamæpelia passerina*. It is admitted that local forms showing more or less vinous colouring in the plumage exist, and if these differ markedly in the colouring of the soft parts they should, in my opinion, bear different names. Baird describes the northern form as having the bill and feet yellow, the former tipped with brown ; Dresser says, " beak purplish black, iris bright red, legs flesh-coloured " ; whereas the

specimens which I have had alive had the bill orange, tipped with dark brown; iris purple, with pale ochreous eyelid; feet pink. In the Bleeding-heart Pigeon the irides have been described as dark brown, but when closely examined they are seen to be plum-coloured.

But it is not only in the soft parts that errors have crept into scientific descriptions and illustrations. The feathers on the head are often taken liberties with. In vol. xiii. of the 'British Museum Catalogue of Birds' the artist has represented the head of the Crested Mynah (*Acridotheres cristatellus*) with a crest from the middle of the bill to the nape, whereas in life the crest begins at the outer third of the bill, and terminates on the forehead; the feathers of the crown lie perfectly flat and smooth, *nor can they be erected.** In like manner the plate in vol. xii. illustrating the species of *Paroaria* is entirely incorrect, *P. cucullata* being the only Crested Grey Cardinal, all the others, in life, having perfectly smooth heads; moreover, the Crested Cardinal has its crest far more erect in life than in the illustration. I always think it a mistake for taxidermists, when preparing skins of crested birds, to fasten back and dry the crests in an unnatural position; it must be most misleading for artists, if not for describers. I have always insisted upon having the crests of my dead birds left standing as in life.

Touching young plumages and seasonal changes of plumage, with the manner in which these changes are contrived, the aviculturist is in a position to be of great use to the systematist. The young of quite common birds are often wanting, even in the best collections of skins, or are imperfectly represented. Thus I found that my late colleague, Dr. Sharpe, was glad to have young examples of the Saffron-Finch (*Sicalis flaveola*), with the ages attached; whilst very young skins of the Zebra-Finch (*Tænio-pygia castanotis*) were in great request, the description of the young having been necessarily omitted from the Catalogue for lack of material. I believe that young examples of the Gouldian Finch (*Poëphila mirabilis*) in the green and grey plumage are still in request, and I hope that any who are successful in breeding

* Such errors are unavoidable when the skins of crested birds are not left as in life, but are strapped down by the taxidermist.

this species, and who lose the young before their change into the adult plumage, will send them promptly to the National Collection.*

As regards the acquirement of the adult plumage, some tropical birds are very precocious, but others extremely dilatory. Some of the little Ploceid Finches (such as *Amadina fasciata* and *Tæniopygia castanotis*) are in full adult plumage and ready to breed when about six to eight weeks old; thus examples of the former, which left the nest in September, were breeding in October; and it is not uncommon for Zebra Finches (*T. castanotis*) to build and lay when eight weeks old. Mr. Meade-Waldo, speaking of the Chinese Quail (*Excalphatoria sinensis*), says: "They were hatched on July 23rd, and were in adult plumage by August 27th."

On the other hand, the Satin Bower-bird is known to be very slow in acquiring its adult plumage; the late Mr. Abrahams used to put the date of change at three years of age, but the Director of the Zoological Gardens, Melbourne, Mr. A. A. C. Le Souëf, says that he "caged a number (at least a dozen), . . . and it was only after the expiration of nearly eight years they began to change colour. I think four or five birds put on the beautiful blue-black plumage, and in a year or two died off. It is therefore evident that the birds only come to their full plumage in old age, and that accounts for the fact that in a flock of, say, one hundred birds, which we often used to see at Gembrook some years ago, there would be only a very few, not half a dozen, black ones among them."†

It is well known that in many species the flocks which assemble for migratory or other purposes consist wholly of birds of one sex. Two or three years ago (and again this year) the bird-market was flooded with Pekin Nightingales (*Liothrix lutea*), of which I bought three dozen examples in various conditions of plumage, hoping to secure plenty of males of that charming songster; but all proved to be hens. It is also well known that old hen birds often assume male plumage towards the end of

* When I last saw the Museum series, the young plumage was unrepresented, but possibly examples may have been since received.

† A. J. Campbell, 'Nests and Eggs of Australian Birds,' p. 192, footnote.

their lives,* owing to disease of the ovary, and it is probable that birds in captivity (which certainly live longer, when properly treated, than birds at liberty) are more subject to that disease than when they are free. This would be a more probable solution of the late assumption of the blue-black plumage by Mr. Souëf's birds than the conclusion that the Satin Bower-bird only assumed its black clothes to die in. The wedding garments of birds are believed to be assumed for the subjugation of the hens, and birds do not wait until they are old before they begin to breed.

There is no doubt that albinism in birds is due to constitutional weakness, and is a frequent result of close inbreeding. If a pair of Sparrows (*Passer domesticus*) takes up its quarters in one part of a building, or in the roof of an isolated cottage, the young, inbreeding for successive generations, are pretty certain to throw individuals with more or less white in the plumage. The White Dove (popularly known as "White Java") is known to be merely the albino form of the Collared Turtle (*Turtur risorius*), and Mr. Abrahams assured me that it could always be produced by close inbreeding from the common type. It is probable that inbreeding first produced the pied Java Sparrows, from which the Chinese, by careful selection, evolved the white variety of that species. White in the plumage of birds is frequently due to old age, and increases year by year. A Chaffinch which I had for about fifteen years acquired quite white eyelids before its death, and a Cordon-bleu (*Estrilda phoenicotsis*), now in my possession, began to acquire a white wing-speculum some three or four years ago; this has now become a large white patch. A pied Chaffinch, which I once caught in the garden, became much whiter at the two succeeding moults; and a pied Blackbird sent to me a year or more ago showed an increase of white after its autumn moult; both were delicate birds, and did not live long, so that I conclude they were probably inbred.

* I had a remarkable instance of this in the case of a Rosa's Parrakeet (*Palæornis rosa*), which was so persecuted by her own child—a powerful young hen—that I had to cage her up separately. Two years later she assumed full male plumage, and a few months afterwards died. When opened the ovary was found to have almost entirely disappeared, the only remains being two twisted knots on the right side, almost simulating small testes.

Of the assumption of the breeding plumage by certain birds without a moult, or with only a moult of such feathers as have to be replaced by decorative plumes and crests, I have written recently in the 'Avicultural Magazine,' vol. viii. pp. 132-5; therefore, I need not enter into that matter again here. Those interested in the dispute as to the possibility of a change in the colour of feathers can easily refer to this paper, and to one which I published in 'The Ibis' for 1897.

It has always seemed to me a strange thing that ornithology, probably the most advanced study in the biological series, should in one respect be at fault, namely, in the reliance which the systematic student places upon the sexing of his specimens by collectors, and his objections to any other method but dissection for ascertaining the sex. Where would the aviculturist be, if (apart from colour differences) he were unable to be sure whether a bird was male or female?

In collections one frequently sees skins which have been incorrectly sexed by collectors—the young of *Cyanospiza ciris*, showing the commencement of the scarlet under surface of the cock bird on the flanks, yet labelled female; or, perchance, such easily sexed birds as the common Linnet, with no indication as to whether they are males or females. If one points out differences in form of beak, width of skull, length of wing, width of wing-markings, or other (apparently trifling, but actually trenchant) characters, one is met by the assertion that these are all variable, and therefore unreliable. I discovered a reason for the supposed unreliability of the sexual characters some years since when comparing my male, female, and young of *Sialia sialis* (the American Blue-bird) with the beautiful series in the British Museum collection. The males of Thrushes are rather longer and more slenderly built birds than the females; they have narrower skulls, and longer and more slender bills; but, when I compared my young cock Blue-bird (which had acquired its adult plumage) with its parents, I discovered that it was shorter than its mother, had quite as broad a skull, and a distinctly broader and shorter bill. I found that this young bird was uniform in every respect with all males of the same length in the Museum series, and that this apparently variable character was therefore due to the fact that *Sialia* acquires its adult colouring

before it has lost all its structurally youthful characters, the bill of the nestling bird not having been perfectly modified into the long slender form of the fully matured male.

I have written so many short articles upon the sexing of birds by external characters, that I feel it would be superfluous to go again over the whole ground. I will therefore confine myself to a few general suggestions, which may be useful as guides to the student of this subject. There may be exceptions to the general rules, because my studies have necessarily been confined to a comparatively small number of species ; and, moreover, there are still many families of birds which I have not examined ; so that, even if my distinctions should prove constant to all members of a family, much yet remains to be done.

So far as I have had an opportunity of testing sexual characters, I believe that among flying birds, in which the male is dominant, the primaries of the male are longer than those of the female, or, at any rate, the wing from its base to the end of the longest primary shows greater length.

In the Thrushes (*Turdidæ*), I believe it will be found to be the rule that the entire body is longer in the male, the skull and bill longer and narrower. In the *Liotriges* the adult males are rather larger than the females, with their bills slightly, but very slightly, broader. In the Bulbuls the same differences occur, but they are more pronounced. In the Tanagers I believe the culmen of the upper mandible in adult cock birds is generally more arched, but the difference is not very marked, and young males in full colour show it less clearly than old birds. However, the sexes of Tanagers generally differ somewhat in colour, even the Superb Tanager (*Calliste fastuosa*) not being difficult to sex when fully adult. The sexes of Finches differ as regards the form of their beaks according to their habits, so that no general rule can be laid down for them ; the males are usually larger than the females, and have longer wings. The Crows (*Corvidæ*) have broader and stronger bills in the males than in the females. The so-called Piping Crows (*Gymnorhina*) have longer and more slender bills in the males. The males of Larks are broader in chest, are altogether larger, and have longer wings than the females. The Parrots (according to the late Mr. Abrahams) have a much more rounded blunter infero-posterior angle to the

lower jaw in the males than in the females. The Doves are very difficult to sex where colour-characters are wanting, but the males usually, if not always, show a more prominent forehead than the females.

If there were no truth in these differences, it would be impossible for the aviculturist, when dealing with species in which the sexes showed no colour differences, to select pairs for breeding purposes. If we take the common Java Sparrow (*Padda oryzivora*) as an example, I may state that at various times I have picked out pairs repeatedly, both for myself and others, for breeding purposes, and hitherto have never been wrong in my selection ; or, if we take the Crested Cardinal (*Paroaria cucullata*) —from five specimens which I purchased some years ago, I selected a pair, and placed them together in an aviary. Presently the cock began to sing and show off to the hen, a nest was built, and one or two eggs dropped on the floor, proving conclusively that my pairing had been correct.

It has been objected that, allowing the sexual differences in the beaks of birds to be reliable when the creatures are alive, so much shrinkage takes place after death, that the character of the beak is modified so as to be untrustworthy for comparison. This, however, is an error based upon supposition rather than experiment. The beak, being the horny sheath of a bony structure, changes its character very little ; indeed, if it did it would hardly form a suitable basis for generic or specific diagnosis.

Touching the construction of nests by birds, a great deal of poetic nonsense has been written. Most nests are pleasing objects, and some are extremely artistic ; but it is not true that the most elaborate nest is entirely beyond imitation by a skilled workman ; indeed, I am satisfied that a Chinese artist would be able to fashion an excellent copy of the nest of a Long-tailed Tit (that most beautiful of English types) in a tithe of the time occupied by the birds. As for the cup-shaped nest, it is formed in the most rough-and-ready fashion, and its beauty is dependent largely upon the materials used in its construction. If you watch a Finch building in a bush, as I have frequently done in my aviaries, you will be astonished to discover how easily it is managed. The hen bird picks up a long piece of hay or a grass-

stalk by the end, flies into the bush, and hops round from twig to twig in circular fashion, so that the stem is left entangled in a circle or half-circle; then off she goes for a second; until at length there is a pile of tangled material somewhat depressed in the centre. Now she sits down, and begins turning round, tucking in ends; then off she goes again for a scrap of moss or wool, and tucks that in; then perhaps there is a little strengthening of the outer walls by tucking in ends, twisting an end of wool round a twig, and so on. The soft inner lining is formed in the most mechanical manner; the bird collects mouthful after mouthful of wool, cow-hair, feathers, or any soft material, and carries it into the nest, until the cup appears almost full; then she sits down, scratches with her feet, and turns round and round until she has moulded it with her body into a compact felted inner cup. The addition of a few horse-hairs generally completes the little structure.* All cup-shaped nests are formed much in the same manner, though some birds use sticks, thorny twigs, straws, or roots, where others use grasses; some strengthen the outer nest with muddy roots, with clay, or cow-dung, where others use wool, vegetable fibre, and spiders' web. The lining also varies, the Song-Thrush using mud or cow-dung, and moulding it with her body until it resembles the inside of half a cocoanut-shell.

There is far more art in the construction of a domed nest, and it necessarily takes the architects much longer; it is all built up bit by bit, of more or less mixed materials, if it be the nest of a Wren or a Tit; and the outside is sometimes decorated with fragments of lichen attached by means of cobweb. It is this which renders the Long-tailed Tit's nest so beautiful an object. If a soft lining is required, soft feathers are frequently used, and the bird entering the cavity, twisting and turning, pushes up with its head, and pokes the ends of the shafts into the walls.

The Weaving Finches (*Ploceidæ*), excepting when they build in holes or other convenient receptacles, have to work both industriously and cleverly before their home is ready; but only in a few instances is the labour confined to one sex, the nest being

* The Chaffinch, however, frequently sticks bits of lichen all over the outside walls of her nest.

generally constructed by the males in the Fire-Weavers (*Pyromelæna*), and in the Yellow and Black African Weavers (*Hyphantornis*) ; by the females in the Whydahs (*Vidua* and allies) ; by both sexes in *Ploceus*, although the female only comes in at the finish to assist the male in forming the cup for the reception of the eggs.

It is certainly a most interesting sight to notice how a *Hyphantornis*, with beak and claw, commences his snail-shell-shaped nest, attaching it to the wirework over the top of an aviary. He is so quick in passing an end of grass through the wire, holding it with one claw, then with his beak pulling it back through the next mesh. But the true Weavers are marvellous; they are born architects, and delight in their work as many an old lady does in knitting.

It is instructive to watch Waxbills (*Estrilda* and allies) at work—the female inside the nest, the male outside—alternately passing the end of a grass-stem backwards and forwards, until a strongly-laced, but semitransparent, globe is formed, with entrance-hole in front (but not invariably with depressed entrance-shaft leading to it). And, speaking of this netting instinct in Weavers, reminds me that among the cup-builders there is a group of very clever Weavers (*Spermophila*), whose nests are suspended between twigs, and formed of fine tough fibre. I supplied my birds with fine willow-fibre, and the delicate lace-like nests, of which unfortunately I did not preserve a specimen, were beautiful little works of art.

How does a bird learn to build the nest which is characteristic of its species, its genus, or its family? Charles Dixon asserted that the young bird remembered and copied the nest in which it was reared—that its gifts were not instinctive. On the other hand, I assert that a bird, by seeing the inside of its parents' nest, could not understand how it was formed inside, much less outside; and that experiment proves conclusively that it does not necessarily form its nest on the pattern of that in which it was reared.

Charles Dixon speaks of a Chaffinch introduced into New Zealand which built a long tapering nest, somewhat resembling that of one of the native birds of that country, as evidence of the truth of his statement. Seebohm, however, in

his 'British Birds,' records the case of a Chaffinch which built a very similar nest in England, with no such pattern to guide it. On the other hand, birds which have been bred for centuries in square boxes fixed in cages, and therefore have had no opportunity, for numerous generations, of inspecting their ancestral homes, when turned loose in an aviary furnished with shrubs, frequently build in the latter nests of the same type as those formed by their wild forefathers. It would be difficult to say when the Japanese first originated the little Bengalee (a true Guinea-pig among birds), of which one ancestor—possibly the only one—was in all probability the Striated Finch (*Munia striata*). It has been bred in small cages, perhaps for a thousand years. When it is turned into an aviary, and elects to build in a bush, it forms the typical domed nest, with entrance-hole in front, characteristic of all the Mannikins. The Canary, on the other hand, invariably builds the cup-shaped nest characteristic of true Finches. I have had these nests built in my aviaries year after year by different birds, invariably reared in the ordinary London breeding-cage.

If we deny inherited memory to birds, how are we to account for the natural fear which hand-reared birds always exhibit at the sight of a Cat; they can have no personal experience of danger connected with the presence of that creature, yet all alike are terrified at the sight of it. The Canary, which has been so coddled by man that it has become stupid, and has been so constantly accustomed to the sight of Cats for many generations, that its natural dread of them has been blunted, is perhaps the only type of bird which frequently loses its life through the loss of the instinctive fear which might have saved it.

It is generally believed that because in certain groups of Weavers the male bird is accustomed to build the nest, therefore the female is unable to do so. This I disproved in the case of a pair of *Pyromelæna franciscana*, which I purchased about the year 1885, the hen of which built and nearly completed a nest, but unhappily died (as did the cock bird) before it was finished. In like manner it is supposed that the hens of the true Finches only are able to build, but in 1895 I bred Goldfinches in one of my aviaries. The first nest was entirely built by the hen, but the second nest was built entirely by the cock, before the young

of the first family were ready to fly. The hen then went and inspected the second home, and, finding it comfortable, took no further notice of her young family, which were reared by their father whilst their mother incubated a second clutch of eggs. It is possible that this may be a not unusual plan among wild Finches, and it would be interesting if owners of large aviaries would look into it carefully.

Touching these Goldfinches, there was another point worthy of note in disproof of Charles Dixon's belief. Although they were wild-caught birds, they built their nests on the floor of a converted travelling Canary-cage hung upon the wires at the back of the aviary, not in a bush or on a branch, as they might have done. I have noticed the same changed habit in the case of the Grey Singing Finch (*Serinus leucopygius*). The Hartz travelling-cage is prepared by removing the perches, food-trough, and water-pot, putting in a solid floor, and pulling out two of the short uprights from one end to leave a small entrance-hole ; and it struck me that the Finches may have preferred this easily defended position for their nests to the exposure of bush or branch ; otherwise there seems no explanation for their change of habit. Birds undoubtedly think and reflect, or they would often be in a bad way. No doubt many of the marvellously protected nests formed by tropical birds are the result of the experimental and reflecting thoughts of the architects through many successive generations.

At the commencement of this article I spoke of the improvement of the intellect in birds when hand-reared, due to their constant association with man. This is frequently shown in the remarkable manner in which they engage naturally in games. I have had both a Pied Wagtail and a Canary (hand-reared), which, without teaching, correctly played the game of " Hide-and-seek," hiding up when we were out of the room, and, on our return, taking no notice of our calls until we had discovered the lost one, when it immediately called out like a child, and ran or flew to meet us. Our Wagtail also played a game somewhat resembling " Touch," as follows :—Three or four persons seated themselves at different parts of the dining-room table, and then the cage-door was opened. The Wagtail flew to the middle of the table, and glanced from one person to the other ; then one

pointed a finger. Immediately the Wagtail rushed excitedly across, and pecked the outstretched finger; then turned, and watched for some other person to do the same. Thus it rushed from one to another until it was tired of the fun, when it returned to its cage to rest. My hand-reared Jay is as playful as a puppy, and doubtless, if instructed by an experienced showman, might have been taught many tricks; but I never care to see any bird do strange things unless it does them for its own pleasure.

The notes uttered by my Wagtail would have puzzled as well as astonished a student of wild birds, so many and varied were they. The tone was changed so as clearly to express glee, anger, expostulation, pleading, fear; they were all call-notes of a kind, but most of them I never heard from a wild Wagtail. The song was very sweet and varied, more like that of the Swallow than of any other British bird.

The nidification of many foreign birds being imperfectly known, it is useful for the aviculturist not only to watch the behaviour of birds nesting in aviaries, but to save and blow infertile, addled, or deserted eggs, carefully marking them with the name of the species, and the date at which they were laid. It is true that the eggs of many imported birds are white, and differ chiefly in size, proportional dimensions, polish, &c., as, for instance, those of the Waxbills, Mannikins, Grass Finches, typical Weavers (*Ploceus*, but not *Pyromelæna*); the whole of the Doves and Parrots; yet to those who do not know them, they are of scientific interest, as representing part of the life-history of the species.

AN ACCOUNT OF THE BIRDS MET WITH DURING A SHORT STAY IN EAST FINMARK.

By N. F. TICEHURST, M.A., M.B.O.U., AND
C. B. TICEHURST.

THE planning of ornithological expeditions has always been a favourite pastime with us, but it was not till the summer of 1901 that the fitting together of different people's holidays would admit of the carrying out of one of our many plans. East Finmark has always been one of our goals, and, because of the ease with which it can now be reached, we finally decided on it as the scene of our explorations. It is quite true that there are no startling discoveries to be made there; but we thought that we should certainly meet with birds we had not yet come across at their breeding quarters, and should have a very pleasant time watching them at close range, in a place where they would be presumably tamer than at home here in England. We expected to be able to study the habits of the rarer waders—*e.g.* Phalaropes, Stints, &c.—where they were in tolerable plenty, and to make the acquaintance of such rarities as the Red-throated Pipit and Arctic Willow-Warbler. We may state here at once that we were disappointed; the birds were few and far between, and of the rarer waders, &c., we saw not one. In the first place, the year was an unfortunate one; during the first and second weeks in June there was over five feet of snow along the whole of the north coast of Norway, and the weather was so bad that the mail steamers were unable to touch at many of the villages along the coast. For this reason doubtless many of the birds, which had already arrived, were driven south again, and nested further in the interior. In the second place, we wanted to get right away from human habitation, and explore new ground, so did not keep near the coast, where doubtless we should have done better, although even there the avifauna was very scanty in

comparison with what it was, as described by a friend a few years ago, at a more favourable time.

The particular ground we fixed on to explore was the valley of the Maskejok, a tributary of the Tana-elv, one of the great rivers, running north into the Arctic Ocean. As the object of this paper is to give a few notes on the birds we saw, we do not propose to go into the whole journey—the poling up the river, the shooting of the rapids, the heavy and fatiguing portages, our life under canvas, and our struggles with the mosquitoes, “the demons of the place”—but to give a short description of the country from an ornithological point of view, and then to give short notes on each of the species of birds met with.

The Maskejok joins the Tana on its western side about four miles north of Seida, where the road from Tana mouth to Vadsö crosses the river and leaves the Tana Valley. The Maskejok Valley here widens out, and the river takes a very zigzag course, running into the main stream between high sand-banks, its mouth being guarded by a sand bar, which makes it very shallow, so much so, that when the river is low, canoes drawing only three or four inches have to be hauled across by hand. For the first few miles above its mouth the river runs almost due west, turning then south-west. For the whole of its course it runs in a well-defined valley, for the most part about a mile wide, the river ranging in width from forty to sixty yards. The banks are low on one side and high on the other, varying with the windings of the river; higher up, where there are fewer bends, both banks are for the most part uniformly low. For the first few miles, as has been said above, the course is zigzag, so much so, that after poling for half an hour the canoe is only fifty yards in a bee-line from where you started; here there are alternate stretches of deep, fairly still water, and short quick shallow runs, where the bottom changes from sand to gravel. Higher up the bottom gradually becomes more rocky, and some eight miles up the rapids begin. The first or long rapid is some five kilometres of rough, rushing water, with boulders of all sizes appearing above the surface, and for the most part only a foot or two deep; at the top of this the river makes a sharp bend round into the first pool; above this there are another two kilometres of rapids to the second pool, and then comes a succession of short rapids

and pools about seven in number, with two long stretches of deep, still water intervening, till the last rapid is reached, above which is the lake. About a hundred yards from where the river runs out of the lake, the Dunkrately runs in—this is a raging torrent with one or two small pools at long intervals, and is quite impassable for boats; at the upper end of the lake the continuation of the Maskejok runs in; it also is more or less of a torrent, and very shallow, so that boats can only be got up it to the lake beyond with infinite labour, when the river is high.

In the upper pools of the river are three or four small islets, and in the lake one, all covered with very dense willow scrub four to seven feet in height; on these an occasional Fieldfare, Redwing, or Common Sandpiper was seen.

The hills on either side, rising more or less steeply from the river banks, are nowhere very high, the highest point being about nine hundred feet. Their sides, almost to their summits, are clothed with thick birch woods, which reach right to the very edge of the river, there being only a very few places along the banks which are clear of trees. Where a small stream comes in, transforming the bank into a swamp, the birches give way to willows, which form a tangled and almost impenetrable thicket six to seven feet high, hence walking up the banks of the river is a very laborious means of progression; all the gravelly points of the river are also clothed with this same scrub. The birches vary in height up to twenty or twenty-five feet, and the only other trees seen were a few small mountain ashes and the willows, though the alder is fairly common near the mouth, where also are the only clear grassy patches, which have been transformed into hay-fields around the one or two small farms. With this exception the valley is quite uninhabited, but the numerous turf huts of all ages and in all stages of decay met with along the banks, show that parties of Finns occasionally visit the river to fish it, while others further away nearer the fjeld are evidently the remains of Fjeld Lapp encampments, as the remains of Reindeer and Wolves and the shed antlers on the fjeld testify. From the south side of the lake a tolerably well-marked foot-track leads across the fjeld to Polmak, on the Tana; this is used by parties of Finns with pack-horses, who come to net the lake. That this is a fairly wild region is evidenced by the fact that during our

stay there two Wolves were seen, fairly fresh Bear droppings were found near the river and on the fjeld, Reindeer spoor was seen in a wet place, so recent that the muddy water had not yet settled in the hoof marks.

The fjeld on either side above the level of the trees is quite bare, the only growth being Reindeer moss and creeping birch, with the small arctic plants and grasses. Here and there in the marshy hollows are a few scrub birches or willow, with rarely a larger patch of the same and a piece of tussocky bog. Of tarns there are very few, as a glance at the map indicates, until the region above and to the south of the lakes is reached ; here the character of the fjeld changes, and from being flat or gently sloping becomes broken up into little hills and hollows, the ground becoming more bare and boulder-strewn ; the hollows are occupied by small tarns, which are deep, rocky, and with boulder-strewn margins, devoid of any vegetation. A few Snow-Buntings breed among the boulders, and there are a fair number of Common Redshanks on the fjeld near, otherwise this region is practically devoid of bird life. This was disappointing, as from looking at the map this would appear to be a particularly favourable place for waders and Ducks of all kinds.

Along the river, a single pair of Ringed Plover, a few Common Sandpipers and Redshanks, Fieldfares and Redwings, with an occasional Merganser or Dipper, were practically the only birds seen.

In the woods, the only common bird was the Willow-Wren ; Fieldfares, and Bramblings were fairly common, Redwings less so ; White Wagtails, Blue-headed Wagtails, Meadow Pipits, and Blue-throats were seen occasionally, while the Siberian Jay, Great Grey Shrike, Osprey, and Lesser Spotted Woodpecker were each seen once or twice.

On the fjeld, the commonest and most generally distributed birds were the Lapp Bunting and Golden Plover ; while the Meadow Pipit, Wheatear, Shore Lark, Whimbrel, and Redshank were locally fairly common, with here and there a single pair of Dotterel. In the willow scrub thickets the Mealy Redpoll, Redwing, Blue-throat, Lapp Bunting, and Red-throated Pipit were found, though none of them, anywhere, in any number.

FIELDFARE (*Turdus pilaris*).—In the birch woods of the Maskejok Valley we now and again saw a pair or two of these birds, but we do not think we ever saw more than four nests together ; from the majority of the nests the young had flown by June 25th, but we managed to get a good series of eggs, though several clutches were very hard-set, and two to three eggs in the clutch the rule ; so that probably those we got



NEST OF FIELDFARE.

were a second laying. It is a well-known fact that where the Fieldfares breed in colonies, other birds often build in or on the outskirts of the colony ; and it has been thought that advantage is taken of the Fieldfares' wariness, and their loud alarm-notes serve to warn the others of any threatening danger. Now, although so far north as this, we never found more than three to four Fieldfares' nests together, and often

they were nesting singly ; we found that it was generally worth while to search the neighbouring trees, &c., and by so doing we several times found a Redwing's, Brambling's, or Redpoll's nest, which we otherwise might have missed. Most often, I think, we found a Fieldfare and a Redwing breeding in company. All the nests we found were in birches, and never more than ten feet up ; in fact, nearly all could be reached without climbing at all. When incubating the old bird sits very tight, and on one occasion, the nest being favourably situated, we were able to take an excellent photograph of the old bird sitting at a distance of six feet, the whole operation of putting the camera together, &c., taking place in full view of the bird, not more than ten yards away. It was not until we almost touched her that she flew off.

REDWING (*T. iliacus*).—By no means common, but generally distributed, breeding in the small swamps in the woods or near the river, and on the hills where the trees begin to merge into scrub. One nest we found was on the high fjeld, in a large patch of scrub willow ; but as high as this the birds were distinctly rare. All the nests were near the ground, the highest being $2\frac{1}{2}$ ft. from it, built in scrub willow on an island in the river. A favourite situation was a dead birch-stump, about six inches high, or in the fork where two or three stems of equal size sprung from the same root ; while another nest was on a pile of tree-loppings, where some wood-cutters had been at work. Most of the nests contained young by June 26th, but the nest on the high fjeld had five fresh eggs on June 28th ; this nest was absolutely on the ground, at the foot of a dwarf willow, and the bird was nearly trodden on by one of us before she flew off with loud chATTERINGS. A few addled eggs were got from other nests. We found the Redwings every bit as noisy and bold when they had young as the Fieldfares, and though from their situation the nests were not quite so easy to find, by hunting where the birds made most noise they did not give much trouble. We found that the cocks stopped singing as soon as the young were hatched, and joined the hens in tending the brood, and doing their best to drive off intruders. The song of the Redwing is quite short, and consists of only a few notes ; but when near enough for one to hear the softer notes, it is by no means devoid of sweetness, and personally, hearing it for the first time, we thought it almost beautiful. Certainly it is repeated with deadly monotony, and on several occasions, when trying to get to sleep in the bright light of the midnight sun, we heartily cursed an old Redwing who, from the top of a birch tree, was pouring out his song about six or eight times a minute, hour after hour, the whole night through.

WHEATEAR (*Saxicola ænanthe*).—The Maskejok Valley was quite un-

suited to the Wheatear, being all birch forest, and even on the open fjeld these birds were quite rare ; only one was seen.

BLUETHROAT (*Cyanecula suecica*).—Met with constantly in the marshy willow scrub in the valley, and almost every marshy bottom on the high fjeld, if it contained willow scrub, held its pair or two of Bluethroats. Its song was constantly heard, and for variety and beauty beats any other song I have yet heard. Now and then we would hear some strange new song, and would spend some time carefully stalking the singer, only to find it was our little friend the Bluethroat again. When the young are hatched the cock, like our Nightingale, stops



NEST OF BLUETHROAT.

singing, and utters a harsh churring note. Both parents feed the brood, and at this time are much bolder and less skulking than usual. The nests, we believe, are very hard to find, and certainly we have found them so in other parts of Norway ; so we must consider ourselves very lucky in having found three. A fourth we spent several hours over, watching the birds going backwards and forwards with food ; but owing to the dense scrub on the banks of a stream, into which they disappeared, we could never successfully watch them on. Two of our nests were found by sheer luck, the hens flying off at our feet when walking through swampy scrub. The first was a neat round nest,

built in the ground, of coarse flat grass-stems, and well concealed among grass some ten inches high ; it contained six eggs about a week incubated on July 3rd. The second was built in the roots of a scrub willow, about 4 ft. high in a very wet swamp, and contained five young about a week old, and a single addled egg of a pale blue colour without any markings. The third nest we found by beating the side of a deep pit, over which we had heard the cock persistently singing ; the hen flew out from a hole in the side of the pit, in which was the nest well concealed by hanging grasses ; it was somewhat larger than the other two, and was made of fine grass, with a little moss outside, and in every way, except the lining, resembled a Robin's nest at home ; it contained (July 9th) five eggs about a week incubated.

WILLOW-WREN (*Phylloscopus trochilus*).—Quite the commonest bird in the whole valley—in fact, the only bird that was really common. The cocks were heard singing from the tops of the birches both by day and night. We were always on the look-out for a new note, having constantly in mind that we might discover the Arctic Willow-Wren, but never once did we hear a note different from that of the common species ; and, though we took the trouble to shoot the birds from nests we got, they proved to be the common Willow-Wren only. It was astonishing how difficult these little birds were to see in the leafy tops of the birches, and, though they might be singing all round one, it was only by standing quite still and trying to locate the song that it was possible to see the birds at all. Our first nest was placed under a rock, and consequently had no dome to it, the rock above furnishing all necessary cover. The others were all situated in the ground, as our Willow-Wrens at home build, and were warmly lined with Willow-Grouse feathers. The eggs or young were invariably six in number, and the former were thickly speckled all over with small reddish spots, being quite different to any I had previously taken. The latest clutch on July 10th were almost hatching, while young a day or two old were found on the same day. We found later that *P. borealis* has occurred in this neighbourhood, as there is a bird (a young one just able to fly) in the Tromsö Museum, though whether it was obtained in the valley or on the Tana, at the mouth of the Maskejok, the label does not state.

WHITE WAGTAIL (*Motacilla alba*).—At the mouth of the river this Wagtail was fairly common about the farm-buildings and hay-fields, but up the valley only a few scattered pairs were seen. A nest was found on June 26th containing six very incubated eggs. It was situated behind a loose board inside a ruined turf-hut in thick wood some thirty yards from the river's bank. A second nest, on July 2nd, had five nearly

fresh eggs, with darker and heavier markings than the first; this nest was under a rock about half-way up the river-bank, at a spot where it was some thirty feet high, and formed of gravel and sand.

BLUE-HEADED WAGTAIL (*M. flava*).—This species, of the darker-headed variety without any eye-stripe, was commoner on the Maskejok than the preceding. It was, however, only present in isolated pairs, at long distances apart, by the river-bank and on the bogs. They seemed to be earlier breeders there than the White Wagtails, as every pair we saw were busily collecting mosquitoes and other insects for their young. We found them very shy, and so long as we were near they would not go to the nest. The only nest we found was empty; it was built of fine grass, and well concealed under a grass-tussock—in fact, it was the only tussock big enough to conceal a nest anywhere near, as at that particular spot there had been a forest fire, and for a mile or more in every direction there was nothing but blackened birch-stumps, and a few flowering plants which were just beginning to recover from the general devastation.

MEADOW-PIPIT (*Anthus pratensis*).—Not a single Pipit of any species was seen in the valley, and very few on the fjeld, where the Meadow-Pipit was almost entirely replaced by the next species. A nest found in a clearing in a wood on the far side of the fjeld on July 8th was probably of this species; it contained five well-grown young.

RED-THROATED PIPIT (*A. cervinus*).—We were much disappointed at finding so few of these birds. On the fjeld we found them in scattered pairs along the edge of the tree limit, and in the islands of scrub in the hollows. A patch of birch and willows a square mile or so in extent would contain perhaps as many as three pairs. The cocks, often accompanied by their mates, were to be seen taking long flights, high in the air, singing all the time. They would stay in the air for quite a considerable time, and then descend swiftly in a slanting direction to settle in the lower boughs of some willow bush, where they were immediately hidden by the thick foliage, amongst which it was only by carefully following their call-notes that they could be discovered. They were distinctly wild, and would flash out of the opposite side of the bush to another farther off often before we had discovered them sitting. I fancy that most of them were feeding their young, but they gave no indication of the whereabouts of the nest, and hunt as we would in this sea of scrub, which was in places shoulder-high, we could never find one.

BRAMBLING (*Fringilla montifringilla*).—Next to the Willow-Wren and the Fieldfare, the commonest bird in the birch woods was the Brambling. The cocks were not often seen, except when looked for

carefully, as the foliage of the birches was thick enough to hide them somewhat effectually ; but their persistent song, if song it can be called, was always in evidence. We spoke above of the Redwing's persistent song, but it was not a patch on the Brambling's for annoyance. A pair had their nest within thirty yards of our tents, and for the fortnight we stayed in that place that bird never ceased from uttering its rasping note for more than half an hour at a time, even after we had taken the nest ! All the nests we found, except one, which was built in a tree that had partially fallen down, were situated from ten to fifteen feet from the ground, and generally in the main fork of a birch. They were all extremely neatly and prettily built of fine grass, moss, lichens, and feathers, almost felted together, and lined with white reindeer-hair, which was to be had in plenty on the fjeld, where the deer had been dropping their winter coats, or rubbing the velvet from their horns. This species had only just begun to lay by June 25th, and we got fresh eggs up till July 10th ; though on July 8th we found a nest containing five well-grown young, the only nest of young we saw. The normal number of eggs would seem to be four, though some had only three, and one contained six.

Snow-Bunting (*Plectrophenax nivalis*).—At one place on the fjeld, where the top consisted of masses of tumbled boulders and small tarns, we came across a few pairs of Snow-Buntings. They were breeding amongst the boulders on the edges of the tarns. No difficulty was experienced in watching one bird to her nest, as she was busy carrying food to her young every few minutes, quite regardless of our presence. We had to remove quite a number of large boulders before coming to the nest, which was in a cranny about four feet from the surface, and contained seven well-fledged young.

LAPP BUNTING (*Calcarius lapponicus*). — Without doubt this was the commonest bird on the high fjeld, where alone it was seen, and where it was generally distributed. They seemed to mostly frequent the swampy hollows, particularly where the scrub willow and birch grew, although they were frequently seen on the bare fjeld, if the ground was tussocky. The cocks were always to be seen in their handsome breeding dress, sitting about on the tussocks or scrub, or flying in the air somewhat like a Sky-Lark, repeatedly uttering their call-notes. The hens were not nearly so commonly seen, and were doubtless for the most part sitting ; but, in spite of days of hunting, we never succeeded in putting one off the nest.

MEALY REDPOLL (*Acanthis linaria*).—We did not see this bird in the valley, except in the woods at the lower end ; possibly in the vast tracts of birch forest their presence was overlooked ; but out on the

fjeld we came across several scattered and isolated pairs breeding in low birch bushes about two feet from the ground. One nest, on June 28th, contained a single egg, as also did another on the following day. On visiting these two again on July 4th the first contained another fresh egg, and the second three eggs, a day or so incubated : in spite of the fact that, not knowing whether we should ever find them again, we had taken the first two eggs. The nests were all lined with Willow-Grouse feathers and willow-down. In the Tana Valley the bird was much commoner, and one of the nests being situated near a farm was lined entirely with chickens' feathers.

SHORE-LARK (*Otocorys alpestris*).—The only place where we met the Shore-Lark was on the bare boulder-strewn tops of the fjeld on the south side of the valley. Here, on the highest tops only, they were in scattered pairs or family parties. On July 4th we obtained a young bird in its first plumage, perfectly feathered. It is possible that some of them were sitting for a second time, but prolonged searching and watching failed to discover a nest.

DIPPER (*Cinclus melanogaster*).—A pair were seen on June 26th, about half-way up the long rapid, and a single bird higher up on July 4th. There was a nest in rather a curious situation at one of the upper pools ; it was built on the end of a birch-bough overhanging the river, and, owing to the length and thinness of the bough, it was impossible to get at it except from a boat.

LESSER SPOTTED WOODPECKER (*Dendrocopos minor*).—On June 27th, while walking through the woods not far from camp, our attention was suddenly arrested by a loud and clamorous alarm-note ; on looking round we found it proceeded from a Lesser Spotted Woodpecker, with her bill full of grubs. In a minute or two she was joined by her mate, who added his voice to the chattering. A short search revealed the small round nest-hole, situated about ten feet from the ground in a decayed birch. The birds were most anxious to drive us away, and kept running up and down the naked boughs of some neighbouring dead trees, constantly uttering their loud notes. On our retiring a few yards they settled by turns just beneath the hole, and fed their young by putting their heads alone into the nest. We often saw them afterwards in the early morning collecting grubs off the dead trees right in our camp. This is the only pair of Woodpeckers we saw, although we found many old holes, and one or two quite new ones, which, however, had not been used.

GREAT GREY SHRIKE (*Lanius major*).—On June 30th, a short way above camp, an unfamiliar note was heard, something like that of our Jay ; it turned out to be the "schak schak" of a very excited pair of

Shrikes, which evidently had young. A short search revealed the nest, situated at the top of a birch tree about twenty feet high; it was a large nest, composed of small twigs and fine rootlets, lined with Willow-Grouse feathers. It was much flattened out by the young, of which one that could just fly was still in the nest; while scattered in the trees close by were the other three rather stronger young birds. Under the tree in which the nest was situated we picked up several pellets, which chiefly consisted of the remains of beetles and moths. Both parents continually fed the young, bringing food from across the river about forty yards away. They were very wary, flying straight up to the young one whose turn it was with loud cries, to which the young responded, feeding him, and at once departing across the river for a further supply, the whole operation only taking a few seconds.

MAGPIE (*Pica rustica*).—Only seen at the mouth of the valley near the farms.

SIBERIAN JAY (*Perisoreus infaustus*).—A family party were seen working their way up stream in the birch trees, close to the river-bank, on June 28th; not seen again.

HOODED CROW (*Corvus cornix*).—Up the valley we only saw about two pairs, though there were several down at the mouth. A pair visited our camp nearly every night, scavenging for scraps. They seemed to come up the river from some distance, and used to arrive regularly from 3 to 5 a.m. We were several times awakened by their raucous voices, and, on lifting up the lower edge of the tent, could see them within a few yards, picking about amongst the pots and pans.

OSPREY (*Pandion haliaetus*).—On June 26th an Osprey was seen circling over the river, and through the glasses the light-coloured "hackles" at the back of his head were visible, so that he was probably an old bird. A short distance further up we came across a nest in a commanding situation at the top of a dead birch, on a point at the bend of the river. It was a large nest made of sticks, with a few pieces of earth inside it; there were no indications of its having been used that year, and it was in bad repair. This nest was well known to the Finns as that of an Osprey, and they said it had been in use for many years. A second bird was seen later flying over the lake, mobbed by about a dozen Arctic Terns.

MERLIN (*Falco aësalon*).—A small Hawk seen near the lakes on July 3rd was probably of this species, though it was too far off for certain determination.

SNOWY OWL (*Nyctea scandiaca*).—The remains of a beautiful old bird were picked up on the fjeld on June 29th; the feathers were scattered over a wide area, and the bones had been gnawed by Foxes,

but the wings and feet were left intact, and the latter we were able to preserve as trophies. It had probably been there since the previous autumn, and possibly had died of old age ; for, judging by the feathers we gathered, it must have been almost spotlessly white.

LESSER WHITE-FRONTED GOOSE (*Anser erythropus*).—There were two pairs of these Geese nesting somewhere near the river, and the two ganders were seen in the river for three days in succession. Both banks were searched diligently by all of our party at different times, and for a considerable distance above and below where they were seen, but without result; however, on July 3rd, we found the two broods of young, with all the old birds, feeding in the river under the bank. The young had been hatched only a very short time, and were easily caught. The old birds were very bold, and flew by our canoe several times, within twenty yards, when it was quite easy to make out their small size, darkly barred under parts, with the white frontal blaze, and their bright orange-yellow legs. There seemed about six young in each brood. One of these young ones was kept by one of the Finns, and reared by hand on bits of grass ; it became quite tame, and thrived well. One or two pairs of these Geese were seen by the side of the mountain tarns, but always flew away together when we approached, nor could we find any signs of other nests or young. Some of them were beginning to drop their primaries, a fact which was well known to the Finns, who remarked that they would now very soon be incapable of flight.

RED-BREASTED MERGANSER (*Mergus serrator*).—This was the only Duck of which we saw more than one pair in the valley. As we poled up the river we put up several pairs or single birds. At one place a bird rose out of a patch of thick willow scrub on a point of land, and on going to the spot we found the nest, which contained nine eggs in an advanced stage of incubation. After blowing them we handed over the remains to the Finns, who boiled them, and ate the bits on bread with great gusto !

LONG-TAILED DUCK (*Harelda glacialis*).—On walking up to a small tarn on July 1st a pair of Long-tailed Ducks flew up and settled on the water. We immediately hid ourselves and watched, but they only fed, and then went to sleep, taking not the slightest notice of us. The hen had probably been brought off to feed by the drake from the nest some distance away, as a prolonged search round the tarn failed to reveal any trace of a nest. We did not see the birds on revisiting the place some days later, and these were the only Long-tails we saw.

COMMON SCOTER (*Oidemia nigra*).—A pair of these Ducks were flying

over the lake when we first arrived, quacking and somewhat excited. We made sure that they had a nest on the island, but were unable to find it either there or round the margin of the lake. We did not see them there again. A single drake flew down the river past our camp one evening.

WIGEON (*Mareca penelope*).—On one or two occasions we saw a single Wigeon in the river, and on July 3rd we found near the same place the Duck swimming with her brood of about eight young. We never saw them again.

COMMON TEAL (*Querquedula crecca*).—One was seen by a pool near the river, and a feather, probably belonging to a bird of this species, was picked up near another tarn.

WILLOW-GROUSE (*Lagopus albus*).—Considering how hard these birds are to put up without a dog, and that at this time of year they were solitary or in pairs, there must have been a very fair sprinkling of them both in the woods and in the scrub on the fjeld. Hardly a day passed without we put up one or more in the course of our rambles. Two nests of seven and ten eggs respectively were brought in by the Finns, and we came across a nest of eleven eggs on July 1st. It was simply a hollow scratched out of the dead leaves under a fallen birch, and the hen ran off on our approach with drooping wings and excited cluckings; she ran along in front of us for some distance, and could not be made to fly. All the eggs were considerably incubated.

DOTTEREL (*Eudromias morinellus*).—We came across in all about four pairs of these delightful little birds, scattered in single pairs over a vast expanse of fjeld. One pair which we saw several times at about the same place possibly had young, though they never took much notice of us, and ran about or went to sleep on one leg quite unconcernedly within a few yards of us. Having found one of these birds that is certainly nesting, there is no bird of this group whose nest is easier to find. This was illustrated very well by the first nest we found. On June 26th, while walking over the fjeld, we topped a small rise, and immediately caught sight of a Dotterel running, with drooping wings and head straight out in front, directly away from us at about twenty yards distance. A short search failing to reveal the nest, we retired below the rise again, and almost immediately saw the bird fly back to the point where we had first seen her; giving her five minutes to settle down, we walked towards the place; she at once ran off as before, but this time, being able to mark the spot more accurately, we were able to find the nest without any difficulty. It was a mere depression in the reindeer-moss, and contained three partially incubated eggs; they were of the light stone-coloured variety, with bold

markings of dark brown. While so easy to find by marking the bird, the nest would be next to impossible to discover by merely searching the ground, so well do the eggs harmonise with the moss and dead leaves. We must therefore be accounted specially fortunate in finding another nest, which we did on July 8th, while walking over the fjeld ; one of us nearly trod on the eggs before seeing them. There did not appear to be any bird about, though probably she had only just run off, as the eggs were on the point of hatching. These eggs were of the same type as the first.

RINGED PLOVER (*Aegialitis hiaticula*).—One pair were seen, and were probably breeding, on a shingly point in one of the lower reaches of the river. We did not stop to look for the nest, as we were then poling up stream, and were disinclined to waste time over nests we did not want. They were the only pair seen in the valley.

GOLDEN PLOVER (*Charadrius pluvialis*).—Fairly common all over the fjeld, and nearly all of them had young. We found them most difficult birds to watch, except from quite a short distance, so well did their plumage match the yellows and greys of the reindeer-moss. Often, when we heard one whistling, it was only by catching a momentary glimpse of the white stripe along the side of the black breast that we could find the bird at all. They were a great nuisance to us on the fjeld, as they seemed to think our only object in coming up there was to find their young ; they would fly all round us, and then settle on a tussock, piping the whole time, and each pair seemed to escort us a mile or more, until it could hand us over to the attentions of its neighbours. Several times flocks of six or eight were seen, and were possibly non-breeders, as they did not seem to affect any particular tract of country, though all were in full plumage. On July 4th we found a nest of four eggs, all on the point of hatching. The behaviour of this bird was very different to that of any of the others, rising straight off the nest about thirty yards in front of us ; she flew low and perfectly silently for about three hundred yards, and then settled on a tussock and commenced piping. On July 8th we found a young one about three days old ; we caught sight of it first running on the bare moss, and on this occasion the old birds behaved in a precisely similar way to all the others.

SNIPE (*Gallinago* sp.?).—One was seen on June 28th. It was drumming over a marsh on the fjeld a long way off.

COMMON SANDPIPER (*Totanus hypoleucus*).—There were several pairs of these birds nesting at intervals along the banks of the river the whole way up. A nest of three eggs was found by one of the Finns

under a willow bush on June 28th; but on our return to camp we found that he had boiled and eaten them, hard-set as they were!

REDSHANK (*T. calidris*).—There were several pairs of Redshanks on the upper reaches of the river, and also on some of the marshes on the fjeld, both to the north and south. They all, by their actions, had young, but we did not trouble to search for them.

GREENSHANK (*T. canescens*).—We saw altogether three pairs of Greenshanks in the valley, all near the lower end. Two pairs were together in a very wet marsh in the woods, and the third pair in a similar place, about a mile distant from the others. Of all the waders, except perhaps the Wood-Sandpiper, the Greenshank is the noisiest and most restless. All these pairs probably had young, and seemed to spend their whole time either flying round or sitting on the tops of dead birches, whistling and chattering continuously. When we were near they all joined in mobbing us; when we hid up they mobbed every passing Magpie or Crow, and, when there was no Magpie or Crow, each pair seemed to be mobbing the other. The young must have been squatting somewhere in the tussocks of the marsh, or in the wood near; but in the thick wood that surrounded the marsh on every side, it was impossible to keep the birds under observation for more than a few minutes at a time; while the mosquitoes that accompanied us in a grey cloud wherever we went immediately got to work in thousands directly we sat down, and made bird-watching an almost unbearable torture.

WHIMBREL (*Numenius phaeopus*).—On several occasions, when on the fjeld, a flock of six or eight Whimbrels flew up from a long distance off, and settled near us, feeding as often on the dry moss as in a wet place. Only once did we come across a single bird, and that was on July 3rd; she rose a good distance in front, but flew away silently and low, and settled some way off. Thinking she had risen from the nest, we marked the spot, and hid up behind some rocks about two hundred yards away; she was soon joined by her mate, who flew up, whistling loudly, from some distance off. Keeping our glasses constantly on her, we saw her run about for a long time, and then fly back to the place from which she rose first, but settled some way off, and then ran to the top of a ridge, where she stood for a quarter of an hour, with her neck stretched up to its fullest extent, keeping a careful watch for any signs of danger. When she had finally satisfied herself that all was right, she ran straight down the ridge towards us, and, much to our delight, we saw her settle down on the moss in almost the exact spot that we thought she had originally risen from. On rising, we had hardly taken two steps before she was off again, flying away exactly as she had done

at first. The nest was merely a scrape in the reindeer-moss, about a dozen yards from a small pool of water. The three eggs were about half-incubated, and rather more distinctly marked than the usual type, with very little of the cloudy suffused markings.

RED-THROATED DIVER (*Colymbus septentrionalis*).—On two occasions a pair of these birds were seen fishing in one of the upper pools of the river, and once a pair—probably the same—were seen on a tarn about a mile from the same place. There were no signs of a nest round the margin, and no Divers were seen on the lake or in any of the fjeld tarns.

SKUA (*Stercorarius parasiticus*?).—One night on the fjeld two birds were seen flying some way off, which, through the glasses, were certainly Skuas, and, as their tails were noticeably long, they were possibly Buffon's Skuas.

ARCTIC TERN (*Sterna macrura*).—Every time we were on the lake we saw eight or ten Arctic Terns; they were always flying rather high up, and on one occasion they were mobbing an Osprey. They were possibly breeding on one of the further lakes, but, owing to the great difficulty of getting the canoes up the intervening streams, we never succeeded in penetrating so far.

Although the results of our small expedition were nothing out of the ordinary, and somewhat disappointing, the open life in a high latitude, and in the vast solitudes of forest and fjeld, was, with all its drawbacks—and those not inconsiderable ones of mosquitoes and other insect-pests—quite enjoyable, and one can look back at it now, far from its humming throng, as a delightful experience. It is possible that anyone enjoying a better season, and penetrating farther into the wilds than we did, would do much better. Two pieces of advice we would offer to anyone thinking of doing so: go prepared with plenty of "bug-juice," and with your minds made up for a perpetual mosquito war; and, secondly, take your canoes up lightly loaded, sending most of your equipment over the fjeld to the lake by pack-horses, and thus avoid many wearisome portages.

NOTES AND QUERIES.

AVES.

Grasshopper-Warbler (*Locustella nævia*) near Laine, Co. Antrim.—On May 23rd, 1902, while walking up the Keelyglen Burn, my attention was called to the unmistakable notes of a Grasshopper-Warbler; it seemed to be close to the river among some thick bushes, but on approaching closer I discovered the bird sitting on the top of a furze-bush among a thick tangle of brambles. I got very close to it, and lay down, when it started its peculiar song, and kept moving its head backwards and forwards. I watched it for a long time, during which it sang at intervals; the duration of each song, I should say, was fully thirty seconds. When I rose it dropped down amongst the brambles, and skulked away. On May 24th I spent over an hour watching and listening to the Grasshopper-Warbler at Keelyglen. I had a good opportunity of viewing it through glasses, although the wind was strong, and it did not sing from the topmost branches, but always kept a little lower down. I easily made out its spotted back and breast, and peculiar shaped tail, and could follow the quick movement of the beak and turning of the head to perfection. When alarmed it flew to another clump of brambles, and after a short interval started its ruling song again; I timed one—I think a short one—as it only lasted twenty-five seconds, the one previous being longer. Thompson says: “It is probably a regular summer visitant to suitable localities from north to south.” I expect, from the peculiar skulking habits of the bird, and from the want of observers, it is overlooked in this locality.—W. C. WRIGHT (Charlevoix, Marlborough Park, Belfast).

Holboell's Redpoll in Ireland.—In November, 1894, an immature female of this large—and, in my judgment, easily distinguishable—species was shot on Achill Island, Ireland, and is now in the Baylis collection. This is, I believe, the first instance on record of the occurrence of *Cannabina holboelli* in Ireland. This specimen, which has been certified by Dr. Bowdler Sharpe, was exhibited by me at the meeting of the British Ornithologists' Club, October, 1901.—F. COBURN (Holloway Head, Birmingham).

The Jay (Garrulus glandarius) in London.—On the 17th June I saw two Jays in a garden in West Kensington. My house is in a road which forms one side of a quadrangle with three other roads. All the houses in this quadrangle are back to back, and each house has a small walled-in garden, with trees in most of them. On the morning of the above date I was seated reading at the window overlooking the garden, when my attention was attracted by seeing two largish birds fly into a tree in the garden of the next house, and immediately afterwards I heard and recognized the harsh alarm-note of the Jay. Going into the balcony, and looking carefully, I made out the two birds. They were Jays. They were moving about restlessly in the tree, and more than once uttered their loud harsh call. I should think I had them under observation for three or four minutes, when first one, then the other rose and flew over the houses, taking a south-westerly direction. It seems to me strange that so very shy a bird as a Jay should be found alighting in a London garden. What wild Jays—for these looked like wild birds, and not escaped prisoners—were doing in the vicinity of London and bricks and mortar puzzles me.—C. T. BINGHAM (West Kensington).

Eggs of the Cuckoo in Nests of the Hawfinch.—On an evening near the end of May, while engaged in a natural history ramble, a set of eggs were shown to me by a youth. They were a clutch of five eggs of the Hawfinch (*Coccothraustes vulgaris*), with the egg of a Cuckoo (*Cuculus canorus*). As I had never previously found this combination, I was somewhat dubious as to its genuineness; but, after a few questions had been asked and answered in a straightforward way, I felt assured on the point, and determined to make a careful and systematic search in the neighbourhood. The result of this was that within a radius of half a mile from the spot two other sets of eggs of the Hawfinch, each with a Cuckoo's egg, were discovered, and a few days later another was found. The Cuckoo eggs were all after the same type, and closely resembled each other in size and colour, and the nests in which they were found were all placed in very similar situations. In quoting this occurrence, may I state that during an experience of upwards of thirty years' active field-work, in the study of ornithology, I have never before found a Cuckoo choosing the Hawfinch as foster-parent for its young.—JOHN PALMER (Ludlow).

Moor-hen breeding in a Rook's Nest.—At a large rookery near here some of the Rooks have again built in the tall Portugal laurels. Just before Rook-shooting commenced, I visited the spot in company with Mr. Michael J. Nicoll. We counted no fewer than seven nests in

the laurels, but, so far as could be gathered from appearances, in only two of the nests—placed on very thin boughs—had the birds been fortunate enough to rear their young; that nuisance—the irrepressible boy—had been at work, and, though the rookery is close to the house, and strictly protected by the owner, the nests, except in the two cases above mentioned, had been robbed. One of the nests was placed very low down—certainly not more than about ten or twelve feet from the ground—and in this a Moor-hen (*Gallinula chloropus*) had evidently brought up her brood; a dead young one was on the edge of the nest, and several pieces of broken egg-shells were in the nest itself. There is a small pool of water close by, where for some years a Moor-hen has been accustomed to place her nest. Some little time ago the weeds and scrub round the pool were cleared away, and there is no doubt that in consequence of her usual nesting place being disturbed the bird availed herself of the empty, low-placed Rooks' nest, in which to lay her eggs.—THOMAS PARKIN (High Wickham, Hastings).

Grey Plover in Birmingham.—On the 3rd October, 1899, several specimens of *Squatarola helvetica* were observed within the boundaries of the city, and one procured and brought to me. This will be read with great interest in connection with Mr. J. H. Gurney's notes (Zool. 1900, p. 112) on the migratory rush of these birds to the east coast, which lasted for ten days, and covered the date of the Birmingham specimens. This is another valuable corroboration of my oft-repeated assertion that Birmingham lies in the direct line of migration of birds passing from east, to west, or south.—F. COBURN (Holloway Head, Birmingham).

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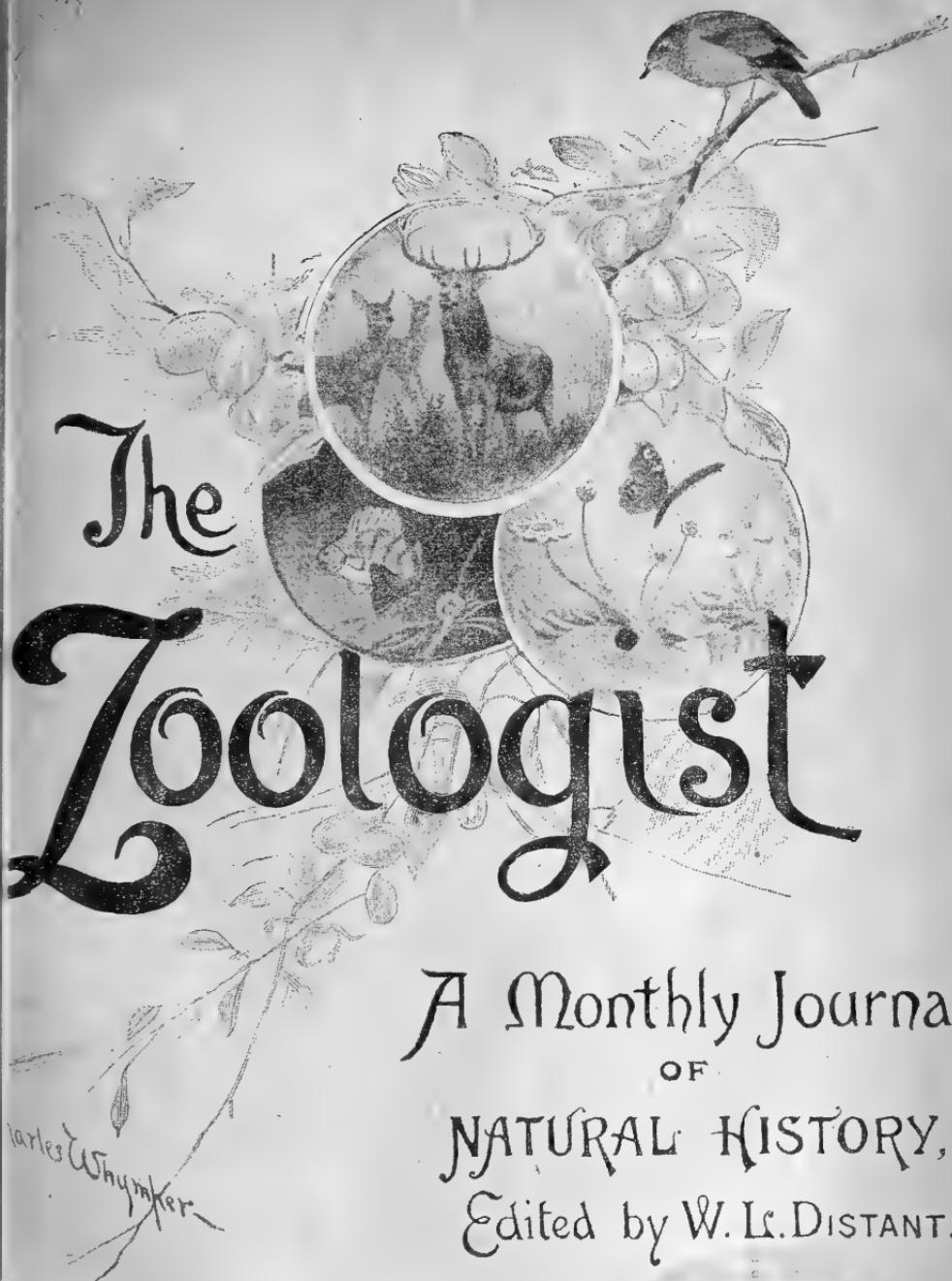
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THE ZOOLOGIST

No. 734.—*August, 1902.*

ERASMUS AS A NATURALIST.

By G. W. MURDOCH, Naturalist Editor of the ‘Yorkshire Weekly Post,’ &c.

THIS article on Erasmus as a naturalist is based on the following works :—

‘In Praise of Folly,’ Reeves and Turner’s edition, 1876.

‘The Colloquies,’ Bailey’s Translation, 1725.

‘Enchiridion Militis Christiani’ (1515).

Nisard’s ‘Etudes sur la Renaissance’ (1855).

Seebohm’s ‘Oxford Reformers’ (1869).

‘Life and Letters of Erasmus’ (Longmans & Co.), for the loan of a copy of which I have to thank a distinguished brother naturalist.

By Sir Thomas More: ‘Utopia’ (English version, 1556).
‘History of King Richard III.’ (1513).

‘Life of Sir Thomas More,’ by his Son-in-law, William Roper (Singer’s rare edition, 1817).

Stapleton’s ‘Tres Thomæ’ (Douai, 1588), and ‘The Life and Writings of Sir Thomas More,’ by the Rev. T. E. Bridget, S.J., (London: Burns & Oates, 1891).

It will be observed that I have included several of Sir Thomas More’s works, and I should have liked to have dealt with these illustrious authors jointly, for it is nearly impossible to separate them in their lives and works, as true naturalists, as unrivalled scholars, humanists, satirists, reformers of gross abuses, and

mutually attached friends. That, however, would have extended this article to an inordinate length; and here I shall leave "Blessed Thomas More" with only one (but that a charming one) reference to that illustrious martyr as a genuine lover of a great variety of God's dumb creatures. It is from the pen of Erasmus himself, and forms part of a long letter (written in Latin, of course) to Ulrich von Hutten, a German noble, who had formed a very high opinion of More's genius from reading his 'Epigrams' and 'Utopia,' and was anxious to learn something about the personality of the author. The following is the passage pertinent to our subject (literal translation):—

"One of his great delights is to consider the forms, the habits, and the instincts of different kinds of animals. There is hardly a species of bird that he does not keep in his house, and rare animals, such as monkeys, foxes, ferrets, weasels, and the like. If he meets with anything foreign, or in any way remarkable, he eagerly buys it; so that his house is full of such things, and at every turn they attract the eye of visitors, and his own pleasure is renewed whenever he sees others pleased."

We have here a charming idea of More, and his writings bear ample testimony to the fidelity of the picture.

"NATURAL HISTORY" IN THE AGE OF ERASMUS.

The literature of this subject is ample enough, but it is more entertaining than instructive, and I only make passing reference to it for the purpose of illustrating, by way of contrast, the scientific standpoint of Erasmus as a field-naturalist, and a really great observer, investigator, and theoriser on the every-day aspects and phenomena of animal and plant life. Erasmus was, of course, thoroughly familiar with the 'De Anima' of Aristotle, the 'Historia Naturalis' of Pliny, and, indeed, with probably all extant writings of the ancients that dealt directly with natural history, or indirectly with it in works of travel and geography. He probably also knew Bartholomew's 'Liber de Proprietatibus,' &c. (1479), 'Hortus Sanitatis' (1490), and a few other contemporary works, mainly borrowed from Pliny ("As Pliny saith"), with a vast amount of mediæval myth, descriptions of rare monsters, &c., added in all simple earnestness and unbounded credulity. It was not in a Gallio spirit that "he cared for none of these

things"; he simply ignored them in his search after the truth as it is in nature, and some of his inductions came near the generalisation of facts as now accepted after more than five hundred years of observation, research, and even elaborate experimentation. For instance, we have had many books, *brochures*, magazine articles, &c., devoted to the subject of "animal instinct v. reason," and I would mention such standard works as 'Animal Behaviour' and 'Habit and Instinct,' by Principal Lloyd Morgan. It is now generally admitted that there is no definite dividing line between what is called "animal instinct" and human reason, however highly developed and widely contrasted may be the manifestations of the latter. Here is a passage from Erasmus's colloquy on "Amicitia" (Friendship), between Ephorinne and John (Erasmus himself), in which he endows a Monkey with quite superior reasoning (contrivance after reflection) powers. The spelling is given as in the 1725 edition of Bailey:—

CLEVER TACTICS OF A MONKEY.

Joh.—That I may not be altogether Shot-free in this Entertainment, I'll tell you what I saw with my own Eyes, in the house of that famous Englishman Sir Thomas More: He kept in his House a large Monkey, who, that he might the sooner get well of a Wound he had received, was suffer'd to go loose. At the End of the Garden there were Rabbets kept in Hutches, and a Weesel used to watch them very narrowly. The Monkey sitting aloof off, quietly, as tho' unconcern'd, observ'd all his Motions, till he saw the Rabbets were in no Danger from him. But perceiving the Weesel had loosened a Board in the back Part of the Hutch, and that now they were in Danger to be attack'd in the Rear, and so be made a Prey to their Enemy, the Ape runs, jumps up on the Plank, and put it into its former Place, with as much Dexterity as any Man could have done. From whence 'tis plain that Apes are great Lovers of this Animal. So the Coneys, not knowing their own Danger, that used to kiss their Enemy through the Grate, were preserved by the Monkey.

ABOUT ADDERS: FACT OR FABLE?

Dr. Leighton has taught us a great deal about Adders, &c., in his 'British Serpents,' and obscure points are being cleared up in the columns of 'The Field Naturalist's Quarterly,' which only shows that we do not yet know everything about the habits

of a very common animal. Here is an extract from the same essay, which is very curious :—

Eph.—I saw once a very large and charming green Lizard fighting with a Serpent, at the entrance of a hole ; I wondered at first what was the Meaning of it, for I could not see the Serpent ; an *Italien* told me that the Serpent was within ; by and by the Lizard comes to us, as it were showing us her Wounds, and begging a Remedy, and did not only suffer herself to be touch'd, but as often as we stood still she stood still, viewing us very earnestly. The Serpent had almost gnawed away one of her sides, and of green had made it red.

Joh.—Had I been there, I should have had a Mind to avenge the Lizard's Quarrel.

Eph.—But her Enemy had hid herself at the bottom of the Hole : But some Days after we had the Pleasure to see her revenge herself.

Joh.—I am glad at my Heart ; but prithee how was it ?

Eph.—We happened to be walking near the same Place, and the Serpent had been drinking at a spring hard by, for it was so violent hot Weather, that we were like to perish with Thirst. A Boy of about thirteen Years old, the Man's Son where we lodg'd, having fled from *Bononia* for Fear of the Pestilence, happen'd very luckily to come by, with a Hay-Rake upon his Shoulder ; as soon as he saw the Serpent he cries out.

Joh.—Perhaps for Fear.

Eph.—No, for joy, rejoicing that he had found the Enemy. The Boy strikes him with the Rake, the Serpent rolls himself up ; but he laid on, till having broke his Head, the Serpent stretched himself out, which they never do, but when they are dying ; that's the Reason that you have heard the Apologist, concerning a Crab-Fish, who killing a Serpent that was his Enemy, when he saw him stretch'd out, says thus, *You ought to have gone so when you were alive.*

We have here a statement about a dying serpent (Adder) that is very suggestive. Whether the "stretching out" action is purely a muscular one, or one due to conscious volition—on the "feigning death" principle—I am not prepared to say ; but this I do know, that some Adders act in that way if violently struck on the head. A good many years ago, when walking across Arran from Brodick to Loch Ranza, I and two friends (both still alive) encountered many Adders sunning themselves on the roads and roadsides, the weather being extremely hot. Several of these I "poked up" gently with my stick, and pitched into

the grass or furze on the roadside. One large specimen, fully twenty inches in length, showed fight, and I gave it severe blows on the head and back. It stretched out, apparently stiffened and "dead." But it was not dead, for in a few minutes it recovered, and tried to escape, when another blow or two finished it off. I am inclined to think that the "stiffening" was due to muscular action produced by the stunning, not killing, blows.

BIRD REFERENCES BY ERASMUS.

These are scattered profusely throughout all his works, and are invariably free from myth or poetic fable, so beautifully employed by Shakespeare, Ben Jonson, and other great writers of the "Spacious Age of Great Gloriana of the West." Erasmus's references, in fact, are mainly those of a field-naturalist. No doubt, apart from his intuitive love of wild life, faunal and floral, his habits afforded him great scope for very varied observations. Erasmus was a great traveller, and he wandered leisurely on horseback in many lands near and far. In his day, too (1467?–1536), animal life (*Feræ naturæ*), even in this country, was exuberant, man's ingenious theories about "regulating the balance of nature" not having arisen, nor, indeed, for many years afterwards. Here are some of the bird references, taken almost "at random," from his great works, and even private letters to friends :—

" What place is for us where so many jackdaws cawing, and magpies chattering."

" Just like a bird in a cage ; and yet, ask if it would be freed from it, I believe it will say, no. And what's the reason of that ? Because it is bound by its own consent."

" Why, sir, are you not ashamed of it ? No ; no more than a Cuckoo is of his singing."

" Are you not ashamed, you sleepy sot, to lye-a-bed till this time of day ? Good servants rise as soon as it is Day, and take care to get everything in order before their Master rises. How loth this drone is to leave his warm nest ; he is a whole hour a scratching, and stretching, and yawning."

This passage stands in need of explanation. In Bailey's translation he, strange to say, uses the word "drone," whereas in the original colloquy it is "Cuckoo." The Rev. E. Johnson,

M.A., who furnished notes to later editions of Bailey's translation, says it is used as "a classic term of reproach for what sailors call a 'lazy lubber.'" Pliny's explanation of it is that it was a mark of sloth if the vine-dresser delayed the work of pruning until the Cuckoo's note was heard, *i.e.* till after the spring equinox. Hence, by association of ideas, the passer-by would "slang" him as a Cuculus! (Pliny xviii. 26). This is a far-fetched explanation. The habit of the bird in laying in another bird's nest seems to be an adequate explanation of the use of the name as a synonym for sloth, drone, &c.

"This peace and quietness is owing to my (Folly) management, for there would otherwise be continual jars, and broils, and mad doings, if want of wit only did not at the same time make a contented cuckold and still house; if the Cuckoo sing at the back door, the unthinking cornute takes no notice of the unlucky omen of others' eggs being laid in his own nest, but laughs and kisses his dear spouse, and all is well."

"What, are you an Augur then?

"Yes, I am.

"Pray by what Auguries do you prognosticate all this? What hath the night Owl appeared lucky?

"She flies for fools."

Erasmus has many references to Owls, and, as in the above, mainly of a classical and mythical character, allusions only made to turn the myths into ridicule. He was too sound a naturalist to believe in the old Owl myths, of which many are still preserved in classic literature, folk-lore, and even in immortal poetry:—

"Hark! Peace! It was the Owl that shriek'd,
The fatal bellman which gives the stern'st good night."

"The Owl shriek'd at thy birth, an evil sign,"

"The Screech-owl, screeching loud,
Puts the wretch, that lies in woe,
In remembrance of a shroud."

I have marked many passages in the works of Erasmus, all bearing directly on phenomena of natural history; also in the works of his friend Sir Thomas More, of ever blessed memory; but in the meantime the above must suffice.

THE TEMPERATURE OF INSECTS.

BY GEOFFREY SMITH.

NATURALISTS whose pleasure it is to try and enter sympathetically into the conditions and capacities of all living things will be greatly interested in an account which Prof. Bachmetjew, of Sophia, has published of his experiments on the temperature of insects.* This account tells us in a clear and masterly manner of an excursion into the field of invertebrate physiology—a field too little cultivated by professed biologists, owing, it must be supposed, to the great difficulties encountered, and not to the innate barrenness of the land ; indeed, it seems that the problems of biology, which have been so long attacked from an almost purely morphological standpoint, can at this stage of enquiry only be further elucidated by a wider and more searching scrutiny of organs and organisms from the point of view of function. This wider view of Biology is one which is likely to find favour with readers of ‘The Zoologist’ ; and since the researches under consideration are directed towards the advancement of knowledge in this direction, and since they may not be readily accessible to all naturalists, I have ventured to think that a short abstract of Prof. Bachmetjew’s work, with a discussion of its bearings on certain problems of insect coloration, might be acceptable.

We need not occupy ourselves for long in considering the Professor’s method of research ; it is essentially simple and accurate. The fact is well known to physicists that when two suitable metals are placed in contact an electric current is generated, and this current is accurately proportionate in strength to the temperature of the two metallic poles. In the researches which we are going to describe the metals employed were steel and manganese ; the insect whose temperature was to be taken was pierced by a fine needle of this composition, and the strength

* ‘Experimentelle entomologische Studien,’ von P. Bachmetjew. Leipzig, 1901. Erster Band.

of the current induced by the contact of the two metals inside the insect's body was measured by means of a galvanometer; the changes in strength of the current indicated the changes of heat in the insect's body.

The book begins with an historical review of the work of naturalists on this subject since the time of Réaumur in 1734; among other names we notice that of the English naturalist Newport. The conclusion to be drawn from this earlier work is that very different results may be obtained from working at the same material; that the temperature may vary within wide bounds without prejudice to life, and that this variation of temperature is largely dependent on the temperature of the surrounding medium. But the temperature of the surrounding medium is not the only factor in determining the temperature of insects, and it is the first merit of Prof. Bachmetjew's work to have fixed and defined the other important factors which co-operate with it. He separates these factors under four heads—1, the influence of the temperature of the surrounding air; 2, influence of moisture; 3, influence of exercise; and 4, the influence of food and respiration.

The first experiments described were made with the Hawk-Moth (*Deilephila euphorbiæ*). It was found that at temperatures higher than 37° C. the temperature of the moth was always lower than that of the air, the greatest difference being 2.5° , when the moth was at 45.1° C. Above 48.1° the insect ceased to flutter, at 48.6° its wings sank, and at 51.4° it died. At death the temperatures of the air and of the moth were equal. These experiments were conducted in air of normal moisture, but when the air was supplied with additional vapour a different result was observed, for then the insect had a higher temperature than that of the air, and its wings did not sink until a body-temperature of 53° was reached, the air being at 49° . This effect is probably brought about by the moisture in the air preventing evaporation of the insect's juices, and so preventing cooling; while the normal metabolism of the insect naturally tends to raise the temperature. At low temperatures the temperature of the insect was always higher than that of the air. It is interesting to note, in relation to the effect of evaporation, that hairy insects tend to have a higher temperature than smooth, and this fact may

be well explained by the prevention of evaporation from the former.

With regard to the effects of exercise, it was shown by Newport that the temperature of an insect at rest is always lower than when it is in motion ; while Lecoq found that a species of *Sphinx*, during active motion, reached the normal temperature of birds, which is peculiarly high. Bachmetjew has considered the influence of exercise at ordinary room temperatures, at heightened temperatures, and under the application of cold. He found that at ordinary room temperatures ($18\cdot5^{\circ}$) *Sphinx pinastri* raised its temperature by rapid wing-vibration up to 36° . At this point the vibration ceased, owing to a partial paralysis of the wing-muscles ; the temperature then dropped, and the paralysis passed away. On repeating the rapid vibration immediately paralysis set in again more rapidly, but not until the temperature reached 36° ; furthermore, if the surrounding temperature was increased, less humming is required to bring on partial paralysis. There is therefore considerable ground for assuming that it is the heightened temperature which causes the partial paralysis. Just as there is a maximum temperature which brings on paralysis, so there is a minimum ; thus *D. euphorbiæ* ceased rapid vibration when its temperature was at $17\cdot6^{\circ}$, and all movement stopped at $0\cdot5^{\circ}$. Putting these observations together, we see that for the Sphingids observed normal flight is only possible roughly between the temperatures of 18° and 36° C.

The influence of food and of respiration is only touched upon, but we may gather that everything that tends to increase metabolism tends also to raise the temperature.

In the second part of the volume the vital temperature extremes of Lepidoptera are discussed, especial attention being paid to the minimal temperature ; and at the outset a very curious phenomenon is offered for consideration. If a butterfly or moth be cooled by being kept in an iced chamber, a certain point of under-cooling is reached (called the critical point, or K) ; at this point the temperature suddenly rises through more or fewer degrees, and freezing takes place at a temperature above the critical point (called the normal freezing-point, or N). This behaviour of the juices of insects shows a striking analogy to the under-cooling of water under certain conditions. This process

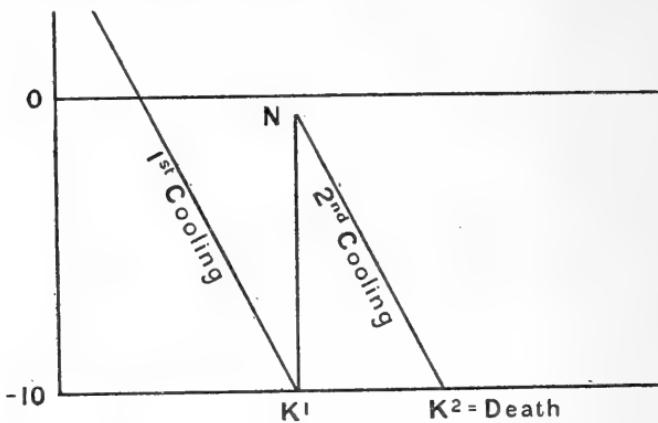
of under-cooling and freezing does not cause death on the first occasion, but, if the process be repeated for a second time, the insect dies when the critical point is reached for a second time. This is indicated by the following experiments on *Aporia crataegi*, the black-veined white :—

1st lot.— $K = -10^\circ$, $N = -1.2^\circ$. When N was reached the animals were removed from the ice-chamber, and lived.

2nd lot.— $K = -8^\circ$, $N = -0.8^\circ$. On under-cooling again to -6.5° , and removing the animals, they still lived.

3rd lot.— $K = -6.8^\circ$, $N = -1.1^\circ$. On under-cooling again to -10.0° , death occurred.

These facts may be graphically represented thus :—



Both the critical point and the normal freezing-point vary not only in different species, but in different individuals of the same species, and at different life-stages of the same individual. Indeed, many factors play a part in determining the nature and relations of these points, such as the rapidity with which the cooling takes place, the sex of the insect, the quantity of food it has eaten, and the amount of time it is kept at any particular temperature.

The number of degrees lying between the critical point and the normal freezing-point is complicatedly dependent on the rapidity of cooling, but the alternatives are so various that it is impossible at present to draw any concise conclusion with regard to them. It is an extremely interesting discovery that males have normally a greater difference between their critical and normal freezing-points than females; but this difference is

equalized by prolonged hunger. This points to one of those curious relations between sex and alimentation, which are so striking and yet so difficult to fix exactly.

In this short review of Prof. Bachmetjew's results, it is hoped that enough has been said to show that a considerable foundation has been laid down for further researches; but reference should be made to the book itself, which is full of carefully tabulated experiments, and most clearly expressed deductions from them.

It is clear that in dealing with the temperature of insects we have to do with a complex phenomenon dependent on a variety of interacting factors, some of which we have already touched upon. In the remainder of this paper I intend to consider one factor which I believe will have to be taken into account if we wish to gain a complete idea of the temperature relations of the so-called poikilothermic animals, *i.e.* animals whose temperatures vary with the surrounding medium. This factor is colour. The radiant powers of differently coloured surfaces are notably different; those surfaces which absorb the long-waved colours are better radiators than those which absorb chiefly those colours which lie at the other end of the spectrum. The emissive and absorptive radiant powers of a substance are directly proportional—a good radiator is a good absorber; it must also be remembered that a good reflector of radiant heat is a bad absorber and radiator, and *vice versa*. It has for long been pointed out that a dark coloured animal would be able to take advantage of sunshine more readily than a light coloured one, and Lord Walsingham used this fact in explaining certain phenomena of melanism in Lepidoptera. In the controversy which arose on this head nothing conclusive was reached, but a certain amount of evidence was brought forward to show that on the whole, in regions where the sunshine was intermittent, a melanic tendency in the Lepidoptera became the rule rather than the exception. My chief collecting-ground for Lepidoptera abroad has been Haute Savoie, in the neighbourhood of Mont Blanc, and I have been struck there with the fact that the two kinds of butterflies which frequented the highest mountain regions were, on the one hand, the dark brown *Erebias*, and, on the other, the white *Pierids* and pale *Coliads*. This contrast struck me for some time as inexplicable on the theory that the colouration bore any

relation to the temperature, but a little consideration showed that the white wings of the *Pierids* might act as reflectors of heat, glancing off the sun's rays on to the black body of the insect, which would thus absorb a greater quantity of heat. I have since tried many experiments in order to test this hypothesis ; the bulb of a sensitive thermometer is tied round with black cloth, and hung up in bright sunshine. This morning a thermometer so prepared registered a temperature which varied between 30° and 31° C. I then backed the thermometer with a sheet of white paper folded so as to imitate the position of a butterfly's wings when expanded upon a flower. In three minutes the temperature had risen to 35° C., and was still rising when I removed the paper ; the temperature immediately dropped. I repeated the experiment, substituting the cups of variously coloured flowers—such as poppies, Canterbury-bells, and so forth—to take the place of the white paper, and I obtained rises of temperature through two or three degrees, according to the reflecting powers of the various colours ; the worst reflector being a dark purple larkspur, and the best a bright red poppy, which increased the temperature from 30·3° to 33·5° C. in a few minutes.

I surmise therefore that the influence of colour on the temperature of Lepidoptera is not so simple as it is usually assumed to be ; on the one hand, the wings may absorb heat directly ; on the other, they may be used as reflectors. It has been urged that the absorption of heat into the wings is a useless proceeding, since they are largely composed of dead structures ; but it must be remembered that haemolymph is present between the lamellæ of the wings, and I conceive that a circulation of this haemolymph occurs from the body to the wings, and *vice versa*, owing to the movements of the wings and body.

Butterflies and flowering plants afford us, both in variety and brilliance, the greater part of the great boon of colour in animated Nature ; both of these orders of beings are in general dependent for the fulfilment of their vital functions on warmth and sunshine. The dark centre of the poppy, where the sexual products are matured, is encircled by a broad open tent of crimson, which flashes from its walls the most potent of the sun's rays. If we are to compute the circumstances favourable to the certain and

speedy occurrence of the chemical action which brings about the maturation of pollen and ova, we cannot neglect this factor of colour. The dusky mountain *Argus*, gathering radiant energy in its wings and body on a sunny slope, at the onset of an alpine storm creeps into the cover of the thick grass, where radiation from its body-surface is not so rapid as in the open air ; it folds its wings above its body, and this again prevents rapid radiation from the vital regions so covered. If it be one of those *Erebias*—such as *E. lappona* or *tyndarus*—which are confined to the highest regions, it offers to the expanse of the outside air not the dark brown of its upper surface, but the lighter grey of the under side of its hind wings, which thus have a lower emissive power. Again, we cannot neglect the factor of colour in determining the vital capacities and functions in so far as they are influenced by temperature.

My object in these remarks has been to draw attention to some experiments by Prof. Bachmetjew on the temperature of insects ; these experiments confirm the opinion that the effects of Nature are seldom brought about by causes acting singly, but by a complex interaction of many simple causes.

The surface colour of organisms must certainly be taken into account when considering their temperature relations ; there appear to be suggestions in Nature that certain colours have been selected as being advantageous to the animals possessing them, owing to their absorptive, emissive, and reflecting powers ; and this factor may have acted in common with many others, known and unknown, in producing the varied effects which we see and admire.

COLLECTING SMALL MAMMALS IN N.W.T. CANADA.

BY EDWIN HOLLIS.

WHILST staying in the neighbourhood of the Touchwood Hills, Assa, N.W.T. Canada, from July, 1901, to April, 1902, I occupied my spare time collecting small mammals for the British Museum. This district is situated about $51^{\circ} 5^{\prime}$ N. latitude, 104° W. longitude, and is about 3000 ft. above sea-level. The country is slightly undulating, open prairie and bush being fairly evenly distributed, interspersed every few miles with lakes. These are all more or less alkaline, some of them so strongly as to kill cattle if they drink any quantity of the water; they naturally contain no fish. There is no fresh running water, but many sloughs (shallow ponds), caused by melting of the snow. The temperature varies from great heat in summer to 40° below zero in winter.

I obtained one or more specimens of twenty-three different species of mammals, which I think are nearly all the wild animals to be found in this district at the present time, although Lynx, Bear, Deer, and Jack-Rabbit are occasionally to be met with. I saw one of each of the two last-named, and these were the only animals I saw of which I did not get at least one specimen.

The following is a list of animals obtained, with remarks on same.

Canis latrans (Coyote; locally called Wolf).—Not at all uncommon, several often being seen during the course of a day's drive. They are practically never dangerous to human beings unless driven into a corner, but are a great nuisance to ranchers, as if they once take to killing sheep or calves they seem to prefer them to other food. Those I got were all caught with hounds, except one suffocated in his earth, for they are too wary to be trapped. Although I set traps round an earth which I knew contained young ones about the size of a small Fox-Terrier, I never had one struck.

Taxidea taxus (Badger).—Not nearly so common now as a few years ago. These were also taken with hounds, except one, drowned out. They are hardly ever seen by day if the weather is fine, but on dull, misty days seem to travel a good deal.

Vulpes fulva (Fox).—Fairly plentiful. Their skins form one of the principal trade furs of the district, prices varying from $2\frac{5}{8}$ dollars for an ordinary Red Fox, to 150 dollars for a Silver Fox. The latter is very rare, only one being taken by an Indian in the season 1901–2. They are taken with hounds, shot, or trapped. I fancy they kill a considerable number of Newts, as I could often see Newts' tails strewn round large stones near a lake, where I could only find Fox tracks.

Mephitis hudsonia (Skunk).—A few years ago these animals were fairly plentiful, but are now getting scarce. I shot mine; but the Indians find where they are lying up for the winter, five or six in a hole, and smoke them out. When annoyed they smell very bad, and great care must be taken in skinning not to cut the gland containing the scent, which is placed immediately under the skin just below the anus. I found it best to remove the gland before commencing to skin. When killed by hounds the smell causes these animals to froth at the mouth, roll on the ground, and bite up mouthfuls of earth, but it does not appear to frighten them from going for the next one they see. The scent is very lasting. I took particular note of a terrier which killed one, with the idea of seeing how long I could notice the smell, but unfortunately after a month she killed another, so I could not tell, but up to that time it was quite unpleasant, particularly if she got wet. I am rather inclined to think, from the quivering motion of the Skunk's tail when attacked, that the scent is ejected on to the tail, and flung from that on to the animal attacking. They are very destructive if allowed to get into a hen-house, killing a large number of the birds, which they neither eat nor carry away.

Putorius longicaudus and *P. cicognani* (Ermine).—Not very common. These are locally called Weasels when alive, but Ermine as fur. Mine were trapped with either beef liver or "Prairie Chicken" heads. The same caution as applies to Skunks requires to be observed in skinning, but the smell is not nearly so strong or lasting. Their habits appear to be the same as those of the English Stoat.

Putorius vison (Mink).—Uncommon. The only one I obtained was taken in a gin. The usual plan for trapping is to make a hole part way through the top of a Musk-Rat house, and there place a trap, for when the Mink is hunting Rats, of which its winter food principally consists, it is sure to try to enter by the hole already partially made.

Lepus americanus (locally called Rabbit).—Has been to a great extent killed off in this district by a succession of prairie fires. It inhabits bush country, and never appears to make its form in the open. I saw no young ones, but was told by half-breeds that they have from three to four at a litter, generally under a fallen tree, not in a burrow. They are easily snared in wires.

Fiber zibethicus (Musk-Rat).—More plentiful this year than they have been for many preceding ones. The skin of these animals is the principal fur taken here. Many thousands are trapped annually, their bodies forming one of the chief articles of an Indian's winter diet. The young are born in a hole in the bank, not in the Rat-house. Trapping these is a very simple matter, as you only have to find a sheet of water too deep to freeze to the bottom, and containing Rat-houses. Make a hole in the top of each house till you can feel the platform used by the Rats on emerging from the water. Place a trap on this and close the hole again carefully to prevent the water-hole freezing. You will probably have one in a very short time, when the process can be repeated till the house is cleared out, and then the water-hole will freeze. The houses contain from two to five Rats.

Spermophilus richardsoni (Grey Gopher).—Very numerous. They live in colonies in burrows on the open prairie, and are a great nuisance to grain-growers, as they gnaw off the straw at the first joint when about eighteen inches high (it is said for moisture), sometimes clearing a space of an acre or two as if mown. They also store grain for the winter. At time of going into winter quarters they are very fat, and are then much sought after by Indians as food. Colour varies from pale grey in winter to quite a yellow tinge in summer. Last seen in fall, 1901, on October 20th. First seen in spring, 1902, on April 1st. Easily caught in gins.

S. tridecemlineatus (Striped Gopher).—Not very common.

They have practically the same habits as the Grey Gopher, but usually only two live in each hole.

S. franklini (Grey Squirrel).—Not very plentiful. Burrowing animal, inhabiting bush country. Pair of old ones and family live together. They appear to me to hibernate earlier in fall, and come out later in spring than the other Gophers. First seen in spring, 1902, on April 29th.

Thomomys borealis (Pouched Gopher; locally called Mole).—Very common. My specimens were all trapped underground. Habits appear to be much like those of English Mole. Last seen in fall, 1901, at beginning of October. First seen in spring, 1902, on February 9th; but they evidently work during the winter, between the snow and earth, as their arched runs can be seen in the grass when the snow thaws. The Indians have an idea that their cheek-pouches are inflated with air, and then compressed to force up their earth mounds.

Tamias quadrivittatus (Chipmunk).—Not very plentiful. They are easily caught. Best bait, almond. If fed while still wild, they soon become tame enough to run in and out of the house. The first I saw, in spring, 1902 (caught April 13th), had barley in cheek-pouches, and was quite a quarter of a mile from nearest barley-field or granary, so evidently had a winter store.

Lasiurus cinereus and *L. borealis* (Bats).—Very few about. I only obtained one of each species, both being taken by hand while hanging in poplar trees during the daytime. The Indians call them little birds with bare wings.

Mus musculus (House-Mouse).—Not very plentiful, but seems to be evenly distributed over both prairie and bush. This appears to be the only very small animal which is constantly about during the coldest weather.

Zapus hudsonius (Jumping Mouse).—Not very common. Frequents very high grass in swampy places. I could never secure one in a trap, although I tried all sorts of baits and traps. Those I did catch were taken by hand, whilst following mowing-machine when cutting hay.

Sorex richardsoni (Shrew).—I only saw and caught one. Bait, cheese.

Onychomys leucogaster (Short-tailed Mouse).—Rare. I understand this has not been previously reported as taken in Canada.

Caught in traps; bait, cheese. It is locally accused of killing young chickens, but I could obtain no reliable evidence on the point.

Evotomys gapperi (Red Vole).—Uncommon. I only caught them on cultivated land.

Microtus (Pedomys) minor (Grey Vole).—Not at all uncommon. Appears to live only in very wet places. I fancy, from remains of shells found in tussocks of rush where they were caught, that their food consists partly of water-snails, although I could not catch one, using snail as bait. Trapped with cheese and almonds.

Microtus drummondii (Brown Vole).—Very plentiful. Appears to be equally distributed over open prairie, bush, and cultivated land. One caught by hand, January 28th, 1902, in open, when thermometer registered 30° below zero.

An old half-breed trapper—who has for many years made the greater part of his living by trapping fur for the Hudson's Bay Company, who do a large business with the Indians, trading goods for fur—gave me many useful hints, on which one or two notes may be of use to other collectors.

When trapping, if unsuccessful, try change of both bait and style of trap, as one or the other will frequently result in a catch where traps have remained for days untouched. Best bait for Mice, Voiles, &c., cheese and ordinary eating-almonds. Smoke and water will be found useful in getting burrowing animals where traps are not at hand. For small holes, pour water in gently, and the occupant will gradually come to the top to escape it; if poured in too fast, they are drowned inside. For large holes, make a good fire in the mouth of one hole; when well alight put on a good handful of grass; immediately close both that hole and all others, except the one from which you wish occupant to bolt. If, as sometimes occurs, the animal remains to be suffocated, it is lost, unless it can be reached with a pliable willow. Select a willow having several branches at the thin end growing close together, cut these off so as to leave a bunch of ends about three-fourths of an inch long. This can then be inserted into the hole till the animal is felt, when by gently twisting the stick the fur will usually get hung up in the short ends, and the animal can then be drawn out. It is impossible

to dig out burrowing animals in winter, as the frost penetrates about four feet.

The gins used by the fur-trappers are, for the collector, much superior to those sold in England, as in the first place they have no teeth, and consequently do not tear the skin; and, secondly, the under part of the spring is put on with a ring round the jaws, like the upper part, so the trap can be bent either way to fit an angle in the hole or run.

NOTES ON THE NESTING OF THE INDIAN DABCHICK (*PODICIPES CAPENSIS*, B. M. CAT.).

By F. FINN, B.A., F.Z.S.

THE Indian Dabchick is not common on the "tanks" about Calcutta—at any rate, I have never seen one myself except on that in the Indian Museum grounds, where I have from time to time turned out many specimens procured in the Bazaar, most of which soon disappeared. At last, however, a pair stayed, and in the autumn of 1900 built a nest in some bulrushes, a few feet only from a masonry platform. Four young were hatched, but disappeared during the floods which took place during that autumn, having probably either fallen a prey to fish, or perished through exposure. The parents, however, took heart, and built again a few feet to one side of their previous site; and I took the following notes on their proceedings :—

October 3rd, 1900.—Saw one egg in Dabchicks' nest, freely exposed all day, and looking very large; one bird hanging about.

4th.—On going to see the bird, it pulled some weeds over the nest, in which no eggs were visible, being no doubt covered already. The bill was used in the covering process, not the feet.

5th.—The bird slipped off at my approach alone, leaving two eggs uncovered, but stayed near as on the previous day. Later, I went with Major Alcock, who was also interested in the birds, and the bird covered the eggs and stayed near, as on the previous day, when we had been together.

8th.—The bird covered the eggs, and got off when I approached.

9th.—The bird did not get off the nest when I went to see it.

(The birds later on did not sit in the day, or even stay near the nest.)

24th.—Bird sitting very closely ; she raised herself, and let me see the eggs (two only), now of a buff colour, and then spread out her feathers, and settled down on them.

25th.—About midday I saw the bird rise and cover the nest, and get off, when a young one crawled (on all fours) after her, and crept under her wing on the water. She was brooding in the evening.

26th.—I thrice saw the old bird go off, leaving still two eggs.* On the first occasion I saw no young ; on the others it crawled off, swam to her, and crept under her long flank-feathers, the legs disappearing last ; on the third occasion I could see all this distinctly.

November 5th.—I saw for the first time the young birds swimming in the open water, and following the parent. Until now they have almost always been on its back, where one could see the two heads [one more bird had been hatched] sticking up, the bodies being under the old bird's wings. They were sometimes on the nest, but rarely just outside it. They could not walk or even stand up at first. The larger parent was the carrier.

7th.—Saw young birds, right over at the other side of the tank, dive for the first time.

11th.—Watched the old one go on to the nest at night, and one young one, which had been standing up, get under its parent's wing, but had to leave for fear of disturbing them. The old birds bullied some Ducks to-day, but not a Coot; while neither Coot nor Ducks took any notice of their young.

13th.—Saw the young—one with each parent—separate, at opposite ends of the pond.

16th.—I saw the smaller young bird pecked away by one parent which it was accompanying, and crying very loudly ; while the other young was on good terms with its attendant old bird. Later, I saw both together with one old bird, which drove both away ; but then more than once fed the smaller one, deliberately driving the other off ; this larger chick was

* I do not know how I could have overlooked the third egg, but probably it was covered on the 24th, when I saw the other two.

hunting for itself. Later, saw them all near each other; both young hunting. [The food was shrimps and insects; no fish given as yet.] One parent—the smaller—was sometimes alone now.

21st.—Saw only one old Dabchick, feeding one young bird, but repelling the other larger chick. The nest has now disappeared.

25th.—I found the bigger young bird some little way out of the water, near the servants' quarters. The men said they had put it back, but it persisted in coming out again. I took it indoors. It only showed the striped down on the head, and the quills were growing. The beak was buff and black, not pink as when new hatched. I had seen it hunting for itself for some time, but only on the surface, although both young were more ready to dive on alarm than the parents. Only one parent was in company with the other.

26th.—The young bird taken out yesterday died this morning, although I had fed it; it proved on skinning to be very thin, with no fat even on the skin.

27th.—The other young bird still with the one parent now remaining on the tank, and being fed; it is still more ready to dive in fear than the old one, and keeps very close to it, though nearly as large.

December 1st.—Young Dabchick still with parent, and on the most familiar terms, trying to climb on its back. [They often did this when first compelled to paddle their own canoes at an earlier age.]

8th.—Saw the old bird feed the young one with a fish, the first time I have observed this food given.

15th.—Saw the old bird driving the young one.

16th.—Saw the young bird first fed and then driven off.

17th.—Saw the young bird fed simply,

22nd.—Saw the young bird well chased by its parent, and trying to associate with Coots (now two). It crouched somewhat when frightened by its parent, as when wanting to be fed.

23rd.—The two Dabchicks near each other, but the young one evidently in fear of the old.

24th.—The young bird chased by the old one, which I saw, later on, feed it nevertheless.

A few days later I saw the young bird, which was now full-winged, trying to fly.

January 7th, 1901.—I saw two old birds on the tank (the absentee having evidently returned) on good terms, meeting and chattering; no sexual display, however, though both are in full plumage, equally showing rufous on neck. [I have since watched them through another winter (1901–1902), and seen them retain full plumage all the time.] Young bird apart, flying once or twice, as well as an adult.

March 2nd.—Both old birds still present, in summer plumage, and carrying nesting material. When courting, the bigger bird chatters most, and expands the flank-feathers slightly. A new bird, in almost complete winter* or immature plumage, which I put on, was chased by one old bird at least, as their young one has always been of late when they are near it. I saw this not long since, when threatened, stoop supplicating, as when about to be fed.

After this I took no systematic notes, but one or two occurrences which I have not dated seem to me to deserve notice. On one occasion I saw one of the young—then very small, and being carried by one parent while the other hunted for them—trying to swallow a large bright red dragonfly, which was obviously too big for it. The parent carrying it, on this, turned round and took the insect away.

On another occasion the carrying parent, on my approach, swam away from the nest with the young on its back, and the other hastened to it, and there was much chattering. Then the unburdened parent swam to the nest, made a peck at it—I being there all the time on the platform overlooking it—and then went back to its partner, when there was more chattering. The whole performance looked as if this bird had inquired as to the cause of

* It is obvious, from what has been said above, that the so-called winter plumage is merely that of immaturity in this species. I have never seen the pair of birds whose actions I have here noted in any but full adult summer plumage at any time. It is possible, of course, that this pair are abnormal, or very old individuals, but there is no proof of this, and they are free birds leading a perfectly normal life in every way. (See B. M. Cat. vol. xxvi, p. 517, on *Podicipes tricolor*.)

its partner's alarm, and had gone to reassure it by examining either me or the state of the nest! I have no doubt that the old birds know me.

I could not see that the very beautiful striped colouring of the tiny pink-billed young was at all protective, and the brooding old bird, with the young *on its back* under the wings, was more conspicuous than when not so occupied, owing to the partial dis-tension of the wings causing the white secondaries to appear in a very noticeable patch.

ORNITHOLOGICAL NOTES FROM SURREY.

By JOHN A. BUCKNILL, M.A.

(Concluded from p. 281.)

OSPREY (*Pandion haliaetus*).—Mr. Styans tells me that Mr. W. Stafford informed him that the specimen referred to in my ‘Birds of Surrey’ (p. 200) as having been shot at Abbot’s Pond, was killed there in 1840. This specimen is in the Charterhouse Collection. Another, which was in Mr. Stafford’s possession, and which was probably one of those sold apart from the main collection, was obtained at Forked Pond, near Thursley. This is one of some three or four specimens which were sold at Stafford’s sale without locality or date, and were not included in the type collection sold to Charterhouse in 1891.

NIGHT HERON (*Nycticorax griseus*).—A fine adult male was shot at Ditton Marsh on June 12th, 1855, and preserved by F. Yearley (F. Styans and J. Mitchell).

LITTLE BITTERN (*Ardetta minuta*).—A male was shot on the Thames, at West Molesey, about the year 1870, and preserved by Mr. F. Yearley (F. Styans and J. Mitchell).

BITTERN (*Botaurus stellaris*).—Mr. Styans and Mr. Mitchell had notes of the following specimens not hitherto recorded:—

1. A female shot in 1844 by Mr. W. Simmons near New Mill, Haslemere.
2. A male shot at Woodside, Esher, in 1855, in October.
3. A male on the Mole, near Molesey, in the same month of the same year.

The two latter were preserved by Mr. F. Yearley. Mr. F. H. Birley informs me that he saw a specimen, shot on Dec. 30th, 1884, on a now drained mill-pond at Lingfield (*in lit.*).

WHITE SPOONBILL (*Platalea leucorodia*).—Mr. Gordon Dalglish informs me that he has seen a specimen which was shot on a small pond at Claudon Park on Nov. 26th, 1901; it was a female,

and was preserved by Mr. Braddon, of Guildford. It was recorded by him in 'The Zoologist,' Jan. 15th, 1902, p. 32. It is the first record from Surrey since the year 1862.

GREY-LAG GOOSE (*Anser cinereus*).—A specimen was shot at East Molesey, on the river, in hard weather, in January of 1880. It passed into Mr. F. Yearley's hands for preservation (F. Styans and J. Mitchell).

BEAN GOOSE (*A. segetum*).—Capt. E. Barnard Hankey informs me that in the winter of 1892 a specimen was shot by himself and his brother at Cannon Farm, Fetcham, on the bank of the River Mole. It is preserved, and is now in the possession of J. Barnard Hankey, Esq., of Fetcham Park, where I have examined it. I am glad to be able to record this the second definite instance of the shooting of this species in the county. The only other local example of which I am aware was shot near Godalming in 1841, and is now in the Charterhouse Collection.

BERNACLE GOOSE (*Bernicla leucopsis*).—In the winter of 1875 a specimen was shot on the Thames, at Thames Ditton. It was preserved and exhibited at the 'Bear Inn,' Esher, being stuffed by Mr. F. Yearley (F. Styans and J. Mitchell).

POCHARD (*Fuligula ferina*).—One was shot at West Molesey on Jan. 8th, 1869, and preserved by Mr. F. Yearley (F. Styans and J. Mitchell). On Fetcham mill-pond—which, owing to its numerous springs, is seldom, if ever, frozen over, and is consequently a favourite resort for duck in hard weather—this species frequently occurs. Capt. Hankey informs me that he has seen as many as thirty or more together on the lake, and on one occasion killed no fewer than eight in one afternoon. He has some specimens preserved from that locality, and on Boxing Day, 1901, shot one out of a small flock which were on the water. On the 5th January, 1902, a male was observed by Mr. Gordon Dalgliesh on Forked Pond, near Milford (*in lit.*).

TUFTED DUCK (*F. cristata*).—Capt. Hankey informs me that this species has occurred occasionally on Fetcham mill-pond in hard weather, and he has preserved specimens shot at that place. On Boxing Day of 1901 a pair were observed and one shot by him on that water. This specimen he kindly presented to me, and it is now in my possession.

SCAUP (*F. marila*).—A male was shot on Jan. 10th, 1877, on

the Mole, close to its junction with the Thames, and preserved by Mr. F. Yearley (F. Styans and J. Mitchell).

GOLDEN-EYE (*Clangula glaucion*).—Capt. Hankey informs me that he has shot specimens on Fetcham mill-pond; he has three examples from the lake. A female shot, Shamley Green, Guildford, Nov. 17th, 1901 (Zool. 1902, p. 32, and *in lit.* G. Dalgliesh).

SCOTER (*Oidemia nigra*).—A specimen was shot at East Molesey on April 17th, 1878, and preserved by Mr. F. Yearley (F. Styans and J. Mitchell).

GOOSANDER (*Mergus merganser*).—A male was shot at West Molesey on Jan. 10th, 1877, and preserved by Mr. F. Yearley. Mr. F. Styans saw a female in the flesh in Mr. W. Bradden's hands for preservation, which was shot during very severe weather on a pond near Farncombe, Godalming, on the 28th of January, 1881 (F. Styans and J. Mitchell).

SMEW (*M. albellus*).—Mr. R. W. Courage had a specimen in his collection—a female—shot near Thursley in 1874, in winter (F. Styans and J. Mitchell).

RED GROUSE (*Lagopus scoticus*).—For further notes on this species, and its connection with the county, I may refer your readers to this Journal (*ante*, p. 27).

QUAIL (*Coturnix communis*).—Mr. F. Styans saw one in Mr. Bradden's hands for preservation, which had been shot in September, 1880, near Guildford; and several were killed in the same autumn on Wey-Down Farm, amongst some clover not far from the same locality, by a Mr. F. Roberts (F. Styans and J. Mitchell). Mr. F. H. Birley, of Lingfield, informs me that he has eggs taken in June, 1893, at Little Bookham (*in lit.*). Mr. G. Dalgliesh has an egg from a clutch taken in a corn-field near Milford in 1893 (*in lit.*).

SPOTTED CRAKE (*Porzana maruetta*).—A male was shot at East Molesey on May 10th, 1871, and preserved by Mr. F. Yearley (F. Styans and J. Mitchell).

WATER RAIL (*Rallus aquaticus*).—Mr. Gillman informs me that he observed this species on Wimbledon Park pond in the 'sixties on more than one occasion (*in lit.*). Mr. F. Styans shot a young bird in the summer of 1881 on the Wey, near Stoke, where it had doubtless been bred. Mr. G. Dalgliesh has a recent specimen from Abinger Bottom, near Guildford (*in lit.*).

COOT (*Fulica atra*).—Mr. F. Styans informs me that in former years, when this species was much more abundant on Frensham Great Pond than it is now, an annual battue used to be held there in autumn, on which occasions large numbers were killed. In 1880 over a hundred were shot on the first day, and upwards of fifty on the second.

STONE CURLEW (*Ædienemus scolopax*).—Mr. J. Mitchell informs me that in the summer of 1900 he observed two pairs in the county, which were undoubtedly nesting; he does not wish me to indicate the locality precisely.

DOTTEREL (*Eudromias morinellus*).—Mr. Mansell, the well-known taxidermist, of Farnham, informed Mr. Mitchell, in 1880, that about thirty years before that date he saw a small flock of five on the margin of Frensham Pond, three of which were shot and preserved by him. One of these would probably be the specimen mentioned by Mr. Spicer in this Journal (1854, p. 4367) as having been killed near Farnham shortly prior to that date, and as then in his collection (*vide* 'Birds of Surrey,' p. 285).

RINGED PLOVER (*Ægialitis hiaticula*).—A specimen was shot at West Molesey on May 7th, 1878, and preserved by Mr. F. Yearley (F. Styans and J. Mitchell).

OYSTERCATCHER (*Hæmatopus ostralegus*).—A specimen was shot on the Thames, at East Molesey, in the autumn of 1872, and was preserved by Mr. F. Yearley (F. Styans and J. Mitchell).

GREY PHALAROPE (*Phalaropus fulicarius*).—Mr. R. W. Courage had a specimen which he shot shortly prior to 1880, in the autumn, near Thursley (F. Styans and J. Mitchell).

WOODCOCK (*Scolopax rusticola*).—In and before the 'eighties the Woodcock nested regularly every year in the Thursley district, where Mr. R. W. Courage found the nest. In one morning during the winter of 1879–80, a Mr. R. Mason and another gun killed fifteen near Haslemere (F. Styans and J. Mitchell). Mr. Birley informs me that he knew of the nest in 1886 at Lingfield. This nest, which is referred to in this Journal in 1887, p. 194, had a curious history. It was first noticed by Mr. Herbert Fisher's gamekeeper on the 11th of April; it then contained five Woodcock's eggs and two Pheasant's eggs. One of the Woodcock's eggs was slightly cracked, and another much damaged. On the 16th of April, Mr. Fisher himself went to the nest, and

took away four of the Woodcock's eggs, and on the following day Mr. Birley saw the nest, from which a Woodcock was flushed, which had been sitting on the two Pheasant's eggs and the remaining egg of the Woodcock. Mr. Fisher retained two of the Woodcock's eggs, and gave Mr. Birley the other two. The fifth egg was broken beyond repair. The occurrence seems worthy of note, as the Pheasant was probably the interloper.

GREAT SNIPE (*Gallinago major*).—A very large Snipe was obtained during this winter at Ashtead, and was supposed to be of this species; I found, however, on examination, that it was only a fine specimen of the Common Snipe.

COMMON SNIPE (*G. caelestis*).—Mr. Birley informs me that in the early 'eighties this species used to nest pretty freely in the neighbourhood of a now drained mill-pond near Lingfield (*in lit.*).

JACK-SNIPE (*G. gallinula*).—Messrs. Styan and Mitchell had notes of its occurrence near Guildford, Godalming, and Haslemere.

KNOT (*Tringa canutus*).—A male was shot at East Molesey in the autumn of 1877, and preserved by Mr. F. Yearley (F. Styan and J. Mitchell).

DUNLIN (*T. alpina*).—A specimen was shot at East Molesey on April 10th, 1878, and preserved by Mr. F. Yearley (F. Styan and J. Mitchell).

GREEN SANDPIPER (*T. ochropus*).—Mr. Styan had notes of the occurrence of this species prior to or in 1880 on the Tillingbourne, near Gomshall; on a pond at Witley; on the Wey below Guildford; at Newland's Corner, on the Merrow Downs; and on Reigate Heath.

COMMON SANDPIPER (*T. hypoleucus*).—Mr. Styan had notes of its occurrence in or prior to the year 1881 on the Wey near Sutton Park, at Sickle mill-pond near Haslemere, and at Little Frensham Pond.

CURLEW (*Numenius arquata*).—Messrs. Styan and Mitchell had the following notes on this species:—

1. A specimen was shot at Thames Ditton on Dec. 10th, 1880, and preserved by Mr. F. Yearley.

2. In the same year another was seen at Sickle Mill, near Haslemere, by a Mr. Simmons.

3. Mr. R. W. Courage stated, in 1880, that this species was

sometimes observed near Thursley, being driven inland by rough weather.

4. A specimen was observed in 1882 on Clapham Common by a Mr. F. W. Lucas.

It is also interesting to notice, in connection with the note which I recently communicated to this Journal (1901, July, p. 253) upon the nesting of this species on Chobham Common, in Surrey, that an individual was observed flying over that heath in October of 1900 by Mr. S. H. le Marchant (*in lit.*). On April 15th, 1902, I heard most plainly a large number migrating over Epsom about 11 p.m.

WHIMBREL (*N. phæopus*).—Mr. Yearley preserved a specimen shot at West Molesey on Oct. 8th, 1879 (F. Styan and J. Mitchell).

BLACK-HEADED GULL (*Larus ridibundus*).—A flooded meadow close to the L. & S. W. Railway, near Earlswood, has constantly been frequented during this winter by a number of Gulls of this species; stragglers, doubtless, from the enormous crowd which now visit the Thames.

COMMON GULL (*L. canus*).—Mr. Styan had notes of its occasional appearance inland at Guildford and Haslemere (F. Styan and J. Mitchell).

HERRING-GULL (*L. argentatus*).—In 1901 an interesting occurrence of the breeding of this species in captivity occurred in this (the Epsom) neighbourhood. Mr. Theodore Bell, who had three specimens, found towards the end of May that two were pairing. He shut off the third bird (a cock), and on May 30th a nest of rough grass was completed. The pen in which the birds—which were, of course, pinioned—was quite a small one, being only about three yards by five yards in size. On June 1st one egg was laid, and on June 4th a second. The hen sat very close and well, and on July 1st one egg hatched out; on July 6th the second egg, which showed no signs of hatching, was removed, and on the following day the young Gull died. It was probably a mistake to remove the other egg, which doubtless afforded to the young bird some considerable support from the weight of the parent. I understand that the nesting of this species in confinement (particularly in a small pen, without more water than that contained in a drinking-trough) is of rare occurrence, and I had therefore pleasure in receiving three

photographs taken by Mr. Herbert Bell (Mr. Theodore Bell's nephew), which indicate very clearly the circumstances of the breeding of this bird.

COMMON GUILLEMOT (*Uria troile*).—Mr. W. Simmons, of Haslemere, informed Mr. F. Styan, in 1880, that his father had shot a specimen of this species on Sickle mill-pond, near Haslemere, in the year 1868, after a very severe storm (F. Styan and J. Mitchell).

GREAT NORTHERN DIVER (*Colymbus glacialis*).—In December of 1881, a specimen, weighing $8\frac{1}{4}$ lb., was caught with a rod and line at Virginia Water by the local fisherman, John Keene. The bird took a large Thames Dace which was being used as a live bait for Pike. It was landed after a forty minutes' struggle, and was sent on the following day to H.R.H. Prince Christian, by whom it is believed to have been preserved. Keene, its captor, wrote for Mr. Styan a lengthy account of the occurrence, which was incidentally mentioned in the 'Field' (December, 1881).

GREAT CRESTED GREBE (*Podiceps cristatus*).—Mr. A. Gillman informs me that in the 'sixties he noticed this species on Wimbledon Park pond (*in lit.*). During this winter one was seen on a lake not far from Milford (G. Dalgliesh, *in lit.*).

STORM-PETREL (*Procellaria pelagica*).—In October, 1852, one was shot at West End, Esher, and preserved by Mr. F. Yearley (F. Styan and J. Mitchell). Mr. Simmons informed Mr. Styan that one was picked up dead on a road near Haslemere in 1865 (F. Styan and J. Mitchell). Mr. Dalgliesh records a male, caught alive at a street-lamp on Dec. 28th, 1901, at St. Catherine's, Guildford ('Zoologist,' *ante*, p. 32).

In addition to the above short list, I have received some very interesting communications upon the occurrence in the county of some curious species of obviously artificial introduction, such as the Rock-Dove, Black Swan, and Reeves's Pheasant; and also a considerable number of notes of the occurrence of species, which I do not feel justified in including in this list, owing to the records sent me being records merely of observation. The former have undoubtedly occurred, but only in a semi-domesticated, or even domesticated state; the latter, such as the Snowy Owl, Bar-tailed Godwit, White's Thrush, Rock-Thrush, &c., are without doubt erroneous and unreliable observations.

I might perhaps add to the foregoing notes a few local Surrey names which have recently been brought to my notice :—

CHRISTIAL = KESTREL.—(R. W. Courage, per F. Styans and J. Mitchell. A term used near Thursley ; obviously a mere local pronunciation).

TAPPHO = GREEN WOODPECKER.—(The same authority. The same remarks as to origin apply.)

FANNER = HEN-HARRIER.—(*Fide* Mr. R. W. Courage, of Thursley, per G. Styans and J. Mitchell. Probably an error for Kestrel, as “Wind-fanner” is a common local name for that species.)

I fear that this will be my last contribution for some time to the history of the avifauna in Surrey, as I am leaving England to take up duties in South Africa. I have endeavoured in these notes to bring up to date all my collected observations not mentioned in my book on Surrey Birds, and I hope that in the future some other ornithologist will periodically recapitulate the annual records from my own county.

NOTES AND QUERIES.

AVES.

Red-throated Pipit in Ireland.—In my note on *Anthus cervinus* (*ante*, 1901, p. 264), I mentioned one specimen from Donegal. As there is some doubt about this bird, I wish it to be understood that the record for Ireland must for the present rest upon the specimen shot by me on Achill Island, May 25th, 1895. This latter bird has been certified by Dr. Bowdler Sharpe, Mr. Howard Saunders, and Dr. Hartert, and was exhibited by me before the meeting of the British Ornithologists' Club, October, 1901. I spent three weeks in Donegal, studying the Pipits of one particular district, and hoped to have worked up the material I collected before now; but pressure of other business has prevented me doing so. I therefore think it will be more satisfactory for this explanation to appear, pending the fuller inquiry I hope to make.—F. COBURN (Holloway Head, Birmingham).

Breeding of Linota rufescens on Wimbledon Common.—On June 22nd I found a nest of the Lesser Redpoll on Wimbledon Common. It was built in a thick birch, and was nearly ready for eggs. When I last visited it (on the 29th) it contained two eggs. For obvious reasons it will be as well not to give the exact locality, as I hope they will breed there again next year. I also found a nest of the Wood-Warbler (*Phylloscopus sibilatrix*), containing five eggs, near the same place. I further saw six pairs of Yellow Wagtails on different parts of the Common, and found two nests containing young, one of which was built almost in the centre of the Common amongst the gorse.—M. J. NICOLL (10, Charles Road, St. Leonards).

Notes on the Nesting of a Pair of Green Woodpeckers (*Gecinus viridis*) at Wells, Somerset.—In this district Starlings are so numerous in the breeding season that they have become a serious nuisance to the Green and Greater Spotted Woodpeckers. On May 20th, in an orchard at Milton, a pair of Starlings fought for, and took possession of, a newly finished hole of a pair of Greater Spotted Woodpeckers. On more than one occasion I have also watched battles between the green species and Starlings; the green birds are not so easily beaten off as

the Greater Spotted species. On May 5th I found a pair of Green Woodpeckers trying to occupy a last year's hole in one of the three large trees in Park Wood, not far from the Bishop's Palace, and which might more appropriately be called Nightingale Wood, for my finding of the Nightingale's nest and eggs in this wood is, I believe, the farthest point west of the island where the Nightingale has been discovered breeding. Five pairs of Woodpeckers have inhabited the wood this summer ; the hole was about twenty feet up, and situated in the bole of the tree. The foliage of the nut-bushes not being sufficiently out at this date to hide me, the birds at first seemed shy to enter the hole. These trees, not in the least decayed, contain thirteen previous nesting-holes, chiefly in the various tall branches, and at this date all occupied by Starlings. Just above the old hole in question is a short branch, and on it two Starlings sat, and poured forth their mimicking notes, alternately dropping and turning into the hole ; when swiftly—and, until then, unseen—one of the Green Woodpeckers flew at the hole, and drove the Starlings out on to the short branch. After having quite a tussle it flew up into the higher branches again. One or other of the Starlings repeated this act again and again, but each time a Woodpecker descended, and showed his superiority. I immediately thought of shooting the Starlings, but abandoned the idea, thinking it might frighten away the Woodpeckers. I spent hours on subsequent dates watching the hole, and, as a rule, had not long to wait before seeing one or both of the Woodpeckers ; one would come silently from a near oak, and sometimes alight on the trunk some feet above the hole, where it would stay for some minutes, and peep at me round the tree, the head and beak only being visible. It would then utter its loud " plew plew " notes, as if to tell its mate that danger was nigh ; the cry was answered from close by ; then, with a mode of progression something between a jump and a climb, it descended backwards, or tail first, down the side of the tree to a level with the hole ; and, climbing sideways, it entered. On May 13th no Starlings pitched on the short branch, the above mentioned pair having no doubt given it up as a bad job. On the 15th and 16th respectively the female Woodpecker flew from the hole after I had struck the trunk with a stick, and I concluded she had eggs there ; so at 6.30 a.m. on May 17th, with the aid of a ladder, a mallet, and a chisel, I enlarged the hole, keeping it circular as much as possible, until the lad with me could put his arm in. The nest, or rather hole, contained seven fresh eggs, which I took. I may here mention that I passed immediately under these three tall trees several times daily, for the narrow keeper's path led me to a Sparrow-Hawk's nest, which I was also watching with interest.

On May 21st I noticed one of the birds again at the nesting-hole, which rather surprised me ; so I allowed her what I thought a sufficient time to deposit another clutch, which I intended to take, in order to see how many I could induce her to lay. On June 5th, at 6 a.m., I again visited the nest. The same lad mounted the ladder, and took five eggs, slightly incubated. The birds did not forsake the hole, for on June 20th one of them flew out on my approach ; so I again placed the ladder against the tree on June 28th, at 4.30 a.m. The same small lad again bared his shoulders (for length), and placed his arm in the hole ; but this time he was beaten. He could not reach the bottom of the hole. He tried again and again, but the birds had bored deeper since the last visit. I sent the boy home for the mallet and chisel, and a big lad of eighteen years. The wood was very tough, taking me over an hour to enlarge the hole sufficiently. The nest contained six eggs ; three of them were much incubated, but the other three were quite fresh and splendidly transparent, the yolks being plainly visible.

The Woodpeckers still stuck to the hole, and on July 4th both birds were about the trees. I saw and heard both birds again on July 10th ; so, after allowing them the usual interval of about three weeks, I again borrowed the ladder from the local builder, and assisted in carrying it to the wood at 7 a.m. on Friday, July 18th. As the ladder touched just beneath the hole the bird flew out, and the big lad Parker quickly brought six eggs to the bottom of the ladder, one at a time. I noticed that incubation had commenced. The female seemed greatly agitated, and flew into the tree calling loudly ; she thereby saved her eggs. The lad, by my wish, replaced each one, and we left the vicinity of the nest quickly, leaving her to bring forth her brood. This made a total of twenty-four eggs deposited by the same female in a last year's hole, eighteen of which are in my collection ; and I am sure I wish her every success with her fourth attempt.— STANLEY LEWIS (Wells, Somerset).

Breeding of the Bittern in Herts in 1849.—In the fourth edition of 'Yarrell' (vol. iv. p. 208) nests of the Bittern (*Botaurus stellaris*) are recorded from near Tring, in Herts, and near Drayton Beauchamp, in Bucks. In a footnote the editor suggests that these records relate to the same occurrence. This appears to be the case, for, from information kindly furnished by Miss Williams to Miss Harpur Crewe, I find that the nest with four eggs was taken in July, 1849, at the Wilstone Reservoirs, in Herts, about a couple of miles from Tring, and close to Drayton Beauchamp. The eggs were afterwards accidentally broken,

but were beautifully mended by John Wobley in April, 1853, as appears from the Rev. H. Harpur Crewe's note-book.—FRANCIS C. R. JOURDAIN (Clifton Vicarage, Ashburne, Derbyshire).

Breeding of the Ringed Plover in Worcestershire.—One June 1st I found a pair of these birds (*Ægialitis hiaticula*) breeding by the side of a large reservoir within ten miles of Birmingham. The young were just out of the egg, and I found three of them. This reservoir is a regular haunt of the Ringed Plover on the spring and autumn migration, but is it not very unusual to find them nesting so far inland?—D. B. GRUBB (The Croft, Barnt Green, near Birmingham).

Dusky Redshanks in Worcestershire and Warwickshire.—During my systematic rambles in this district for studying its ornithology, I was, on Sept. 15th, 1901, delighted to find *Totanus fuscus* on the muddy shore of a large sheet of water in Warwickshire. I was attracted by a note which was totally new to me, and, bringing my glasses to bear, found the specimen, which was in the immature dress. In the field this bird may be easily recognized, not only by its note, which, though bearing a family resemblance, is nevertheless quite distinct from that of *Totanus calidris*, but by the white patch across the rump, which shows up very distinctly against the wholly dark wings when the bird displays itself. A fortnight later (Sept. 29th), I saw another specimen of this bird in the winter plumage round a sheet of water in Worcestershire, about five or six miles from the Warwickshire water; and, going the same day to this latter place, I ascertained from the keeper that two more, also in winter plumage, had been seen during the week.—F. COBURN (Holloway Head, Birmingham).

Black-tailed Godwit in Ireland in Mid-winter.—On Jan. 5th, 1900, I received from Limerick a female specimen of *Limosa belgica* in full winter plumage. According to Ussher's 'Birds of Ireland' this bird is very rare in winter. I have now in my collection a fine series of this species, from the first plumage through every grade of autumn, winter, and summer—all procured at different times from Ireland.—F. COBURN (Holloway Head, Birmingham).

NOTICES OF NEW BOOKS.

The Cambridge Natural History. Vol. X. "Mammalia." By FRANK EVERE BEDDARD, M.A., F.R.S., &c. Macmillan & Co., Limited.

THERE is perhaps not so much to be said which is new on this subject, as there is on some other zoological Phyla. We have in recent years been able to read the 'Introduction to the Study of Mammals,' by Flower and Lydekker, and one of those authors has since considerably amplified his subject in the 'Royal Natural History.' Besides these publications, "Mammalia" may be said to be one of the zoological subjects now in vogue, and the monthly descriptions of new and subspecies is astounding to those who thought that the mammalian census was approximately worked out. In America the study is advancing by leaps and bounds, and when a similar enterprise is shown in other zoological regions, our present knowledge of the smaller mammals will probably be shown as quite fragmentary. Moreover, the describer of a mammal is always sure of an audience. To the uninitiated, the larger the form the greater its zoological importance, and the diagnosis of an *Okapia* will be discussed by those who are oblivious to the existence of a fresh-water Medusa. A Gorilla constitutes a more likely topic to draw a sympathetic audience at a British Association meeting than does the story of the life-history of a Nautilus, though sometimes the danger of fever is sufficient to direct a temporary public interest in so minute and humble a form of life as the Mosquito. In the work under notice, Mr. Beddard does good service in again attacking a current mammalian heresy, *viz.* "that ancient quadrupeds are huger than their modern representatives," in many cases the position being reversed. "The Mammalia first appeared upon the earth in a tentative and hesitating way ; they had not cast off many of the characters of their supposed reptilian forefathers ; they shrank from observation and destruction by their small size,

and apparently—so far, at any rate, as their teeth afford a clue—by an omnivorous diet."

Mr. Beddard divides the Mammalia into two Sub-classes—(1) *Prototheria*, including the *Monotremata*, and possibly the *Allotheria*; and (2) *Eutheria*, embracing all the other divisions; and we are glad to see that in the Primates the *Hominidæ* terminate the onward or upward ascendancy of the *Anthropoidea*. We may yet live to see Man more fully described in a treatise on the Mammalia, and our descendants will probably read a natural history commencing near a club-moss, and terminating with the genus *Homo*. In insisting that other animals than ourselves have neither spirit nor reason, we study their bodies only; in approaching man from a spiritual side alone, we are likely to forget that he has a body for zoological classification.

It is needless to say that this book is as handsomely illustrated as the other members of the series, and will be found as readable and useful. Mr. Beddard has not only worked hard to bring his facts up to date, but has also incorporated a notice of many current views and theories which not infrequently are "gladly heard," but sometimes rest on an insecure basis. However, both dogma and theory appeal to a large audience, and always receive a respectful hearing; and, though our author has referred to some speculations, he has also submerged them in a sea of facts.

The Butterflies and Moths of Europe. By W. F. KIRBY, F.L.S., &c. Parts 1-7. Cassell & Co., Ltd.

WE have received the first seven parts of this publication, to which fuller reference will be made when the work is completed. It promises to prove a work of great utility to those many collectors of Lepidoptera who do not confine themselves to a purely British collection, and who remember that these islands form part of the European continental division. It is very handsomely illustrated.

EDITORIAL GLEANINGS.

WE read in a recent number of the 'Athenæum':—“ Not content with his immense Shakespearian labours, Dr. Horace Howard Furness has caught the largest recorded Tarpon (246 lb.), landing his fish in thirty minutes, and returning it, like a sportsman, to the water as being inedible.”

[*Tarpon atlanticus* is now a well-known fish to those anglers who can follow their craft on another continent. Jordan and Evermann gives its range as “ Long Island to Brazil,” and its weight as from 30 to 110 pounds ('Fishes of North and Middle America,' p. 409). Evermann and Marsh, however, in their Report on 'The Fishes of Porto Rico,' state that this fish reaches a weight of “ 30 to more than 300 pounds. The largest one recorded as taken on a hook weighed 209 pounds, and the largest taken with the harpoon weighed 383 pounds, if we may believe the record; but examples weighing over 100 pounds are not often seen.”—ED.]

A MONTH in a lighthouse should be an experience in the life of anyone, but more especially of an ornithologist, versed in and still studying the migration of birds. Mr. W. Eagle Clarke passed the time between the 18th of September and the 19th of October in the Eddystone Lighthouse, and his ornithological observations have recently been published in the 'Ibis.' It is obviously impossible to condense the information given in this paper to the dimensions of our present space, but we notice an interesting and apparently unrecorded fact, that the Herring-Gull feeds exclusively on seaweed, especially on the kind known as “ sea-thongs ” (*Himanthalia lorea*). The “ mesmeric influence ” of the light was found to exercise its greatest force on the Starling, and, after that bird, on the Sky-Lark. The prevalence of rain is evidently a matter of indifference to migratory birds, but the presence of fog has a contrary effect, though this may be largely due to the noise made by the explosions of tonite which takes place every five minutes on the lighthouse during a fog.

AN egg of the Moa was recently offered for sale at the well-known London Auction Rooms. The 'Daily Chronicle' has printed an interesting paragraph anent this egg :—

“ Messrs. Arthur G. Eve and Co., Australian merchants, write to

correct the statement that a Moa's egg was sold in London a few days ago for 200 guineas. That amount was bid, but, as the reserved price was not reached, the egg was not sold. Although this egg must have been lying embedded in the banks of the Molyneaux River, N.Z., for some hundreds of years, it is practically perfect. The egg was found by miners, who, in carefully exploring the river bank, detected it lying on a bed of loam, probably originally exposed, but, when found, covered by river drift. There is (our correspondents say) but one other 'whole' egg of Moa in the world. There is a complete skeleton of the bird in the Melbourne Zoo, and as it stands it is about 12 ft. in height."

IN the 'Avicultural Magazine' for this month, Mr. George Carrick, in a description of a "live bird" expedition to Australia, states that in lat. $39^{\circ} 03'$ S., long. $26^{\circ} 46'$ E., 306 miles from the nearest land, and almost due south of Port Elizabeth, South Africa, a common Nightingale flew on board the steamer by which he travelled. The bird "was immediately captured and caged, and, with a plentiful supply of meal-worms, he was soon quite at home, and seemed most thankful for the little kindness shown him, taking readily to artificial food." The bird was ultimately left safe and well at Melbourne.

MR. G. H. VERRALL has published a second edition of his 'List of British Diptera.' In the first List, published in 1888, 2500 species were enumerated; but of these 170 have been since expurgated, while 427 have been added, and 130 are included in the British fauna for the first time in the present edition, making a total of 2887 species; and it is considered there would be little trouble in bringing up the enumeration to 3000 species.

THE recent death of Mr. Samuel Butler, the author of 'Erewhon,' commands comment in 'The Zoologist.' He was the son of a country clergyman, and grandson of the well-known scholar and headmaster of Shrewsbury, who was afterwards Bishop of Lichfield, and was fond of telling how his grandfather had attacked Darwin's grandfather, that his father had been in controversy with Darwin's father, and he seemed to regard himself as Darwin's hereditary enemy, showing his hostility by the publication of his vindication of Lamarck.

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very fully described and illustrated—in some instances as many as nine figures
being given of one species. The figures have all been drawn from nature by the
Author. Two hundred and thirty-four species are described in this work. With
very few exceptions these are represented on the Plates, and by far the greater
proportion are figured for the first time.

In addition to a very large number of original observations, this work contains,
it is believed, a summary of the most important facts yet published in connection
with the study of the larger species of New Zealand Moths and Butterflies. This
work is the result of many years' investigation in the forests and mountains of this
beautiful and interesting country.

LONDON : WEST, NEWMAN & CO., 54, HATTON GARDEN.



Rolled fragments of bone from the Burmese ferruginous conglomerate.—Centre figure, tooth of
Rhinoceros showing worn facets.

THE ZOOLOGIST

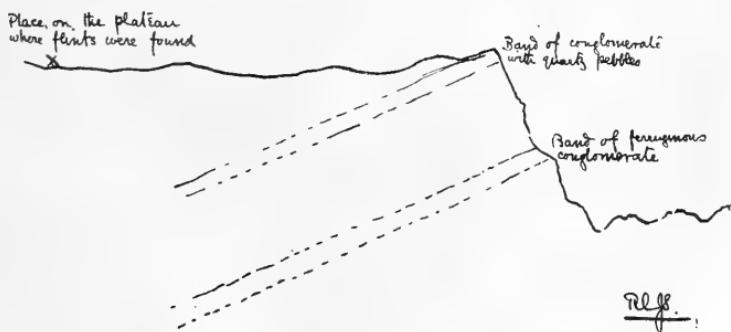
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PREHISTORIC MAN IN BURMA.

By RODWAY C. J. SWINHOE.

PLATE I.

IN the year 1894, Dr. Fritz Noetling, F.G.S., Palaeontologist, Geological Survey of India, published in the 'Records' of that Department an article on certain flints, believed to be artificially chipped, which were stated to have been found in a stratum of ferruginous conglomerate which encircles the dome or anticline at



the oil-fields of Yenangyoung, in Upper Burma.* Dr. Noetling was, when the discovery was made, studying the geology of the

* "On the Occurrence of Chipped (?) Flints in the Upper Miocene of Burma," by Dr. Fritz Noetling, F.G.S. ('Records of the Geological Survey of India,' vol. xxvii. 1894, part 3.)

oil-fields with a view to reporting on their economic value, and was incidentally attracted by the Tertiary remains that occur at this locality. The ferruginous conglomerate, which proved to be very useful in determining the geological features of the oil-fields, was stated to contain numerous remains of *Hippotherium antelopinum* and *Aceratherium perimense*, and was therefore held to be either of Pliocene or Upper Miocene age. The learned Doctor found these chipped flints on a shelf of ferruginous conglomerate on the eastern slope of a ravine high above its bottom, but below the edge, in such a way that he could not conceive how they could have been brought there by any foreign agency, and he says that, to the best of his knowledge, he really found them *in situ*.

While Dr. Noetling was still occupied at Yenangyoung, Mr. Oldham paid a visit to that place, and they made a search together for more flints in the place where the first had been found, but without success; and in his paper on "The Alleged Miocene Man in Burma" ('Natural Science,' vii. 1895, p. 201), Mr. Oldham stated that the flints are not confined to the outcrop of the ferruginous conglomerate, but are scattered over the surface of the plateau above. He further considers the flints to be natural products.

In answer to this, Dr. Noetling published, in 'Natural Science,' x. 1897, p. 233, a further article "On the Discovery of Chipped Flint Flakes in the Pliocene of Burma," objecting that, when the implements occur on the plateau, as near Minlin-toung, at the southern extremity of the dome, they were strictly confined to the outcrop of the ferruginous conglomerate; and in this article he introduced the facetted femur of *Hippopotamus irrawadicus*, which he found in a small streak of the conglomerate not far from the flints, and which, as he believes can only have been facetted by human agency. This he puts forward in support of the Pliocene or Miocene flint implements as further proof of the existence of the human species in Burma in Tertiary times.

Since the publication of these discoveries many writers have referred to them, and in most instances have accepted them as proof of the vast antiquity of man in Burma, and no doubt, besides the few references given here, many more could be found by anyone with access to a good library. In Mandalay, however,

books on such subjects are not numerous ; but it is, in fact, surprising that nearly every book in which the antiquity of man is discussed at all, and that has come under the writer's notice, makes a special allusion to these Yenangyoung flints, and the lessons that they teach.

In 'The Wonderful Century,' edition 1901, Mr. A. R. Wallace says, on p. 131, referring to the great antiquity of man :—" But evidence has been steadily accumulating of his existence at the time of the glacial epoch, and even before it ; while two discoveries of recent date seem to carry back his age far into pre-glacial times. These are, first, the human cranium, bones, and works of art which have been found more than a hundred feet deep in the gold-bearing gravels of California. The other case is that of rude stone implements discovered, by a geologist of the Indian Survey in Burma, in deposits which are admitted to be of at least Pliocene age." In the sixth edition (1900) of 'Prehistoric Times,' p. 402, Lord Avebury, after referring to the Java skull, says :—" Dr. Noetling, of the Geological Survey of India, has also recorded unquestionable flint flakes found in Burma with remains of *Rhinoceros perimensis* and *Hippotherium (Hipparrison) antelopinum* in strata considered to belong to the Pliocene period." In 'The Races of Man,' by J. Deniker (1900), reference is also made to these flints and the polished bone ; and in his popular little book on the 'Story of Primitive Man,' Mr. Edward Clodd also mentions them. No doubt, also, many learned societies, both in England and Germany, have published papers on the subject.

There has thus sprung up round these flints a more or less considerable literature, and, taking them together with the polished bone, the tendency has been to accept them as evidences of the existence of man at a time when the ferruginous conglomerate at Yenangyoung was being deposited, and when the beasts whose remains (chiefly teeth) are found in that deposit were walking the earth. Already we seem to be on a bowing acquaintance with our rude ancestors of pre-glacial times. They chipped flints into flakes, breaking down the angle at the base, no doubt to fix into a handle ; while some flakes, that were not so well fitted for arrow-heads, they doubtless used in the hand as scrapers. After a good meal off a thigh of *Hippopotamus*

irravadicus (whether cooked or not cannot be told) they amused themselves rubbing down the substance of the bone, and making a rude ornamentation by facetting it in this way. Knowing this much about life in these extremely remote times, one naturally wants to know more, especially seeing the great importance of such discoveries in the study of that science which seeks to view Man in his true perspective in the evolution of life on the earth.

As an amateur enquirer into these matters, and finding myself within comparatively easy reach of Yenangyoung, it seemed to me a pity not to make further search, and try to discover further evidences which would place the matter beyond doubt; and this paper is a brief record of two visits made by Lieut.-Col. Nichols, R.A.M.C., and myself, in December, 1900, and December, 1901, with this object. I am bound to confess, however, that our results not only do not corroborate Dr. Noetling in his discovery of Tertiary Man, but cannot, I think, fail to cast a doubt on the age of the flint flakes and chips picked up by him. And, lest it should be considered to be mere rashness in an amateur to venture to discuss technical subjects with a professor of palæontology, I may say that I shall endeavour to record only facts, leaving discussions to others; and that, after all, an amateur can pick up stones almost as well as a professor, while a small amount of geological knowledge will suffice to determine whether, at any particular part of the plateau at Yenangyoung, so conspicuous a band as the ferruginous conglomerate comes out on the surface, or is buried one hundred feet or so below it.

If I cannot resist at times venturing to draw conclusions from facts, such conclusions are no doubt of no value whatever, and may be disregarded.

Our first visit to Yenangyoung, in the Christmas holidays of 1900, may be called a failure, so far as the flints are concerned. We were not aware beforehand of the extremely confusing nature of the ground, intersected as it is in all directions by a network of ravines, and we were disappointed at not finding at Yenangyoung a copy of Dr. Noetling's Geological Map, in which he had marked the spot where he found the flints with No. 49. The Township Officer kindly searched in his office, but the map was not forthcoming, and all idea of locating the flints had to be abandoned,

and instead we occupied ourselves in collecting Tertiary mammalian remains from the neighbourhood. Among these, however, we obtained an upper premolar of a small species of Rhinoceros, which will be mentioned hereafter in connection with the worn femur of *Hippopotamus* found by Dr. Noetling. At Christmas, 1901, Col. Nichols and I made a second visit to Yenangyoung for the purpose of searching for the flints, but since our first visit we had, through the kindness of Mr. T. D. LaTouche, of the Geological Survey of India, and in the absence on leave of Dr. Noetling in Europe, obtained a tracing of a portion of the latter's original map of the Yenangyoung oil-field, showing No. 49.* We had also, during the year 1901, made a collection of Tertiary mammalian remains from a long strip of sandstone almost opposite Mandalay, the locality having been accidentally discovered by means of a stray bone which I picked up on the river-bank at Mandalay Shore, and which we were able to trace as having been brought across the river, together with some large stones used for strengthening the Bund. The sandstone in which these remains were found appears to be a derived bed, and to contain remains of animals ranging from Pliocene, or earlier, to Post-Tertiary times. Out of several hundred specimens, some merely fragmentary, and others distinct and well preserved, which we have carefully examined, not one bears any trace of having been manipulated by man, and though this is only negative evidence, which may be upset any day by the discovery of a specimen exhibiting cuts or deliberate scratchings, it is entitled to some weight, especially having regard to the fact that the flint chips at Yenangyoung, as will be seen hereafter, are to be found in considerable numbers. If these are but the survivors of the changes and chances of this world since Pliocene times in this one locality, they would indicate a large population in Burma at this period overrunning the country, and living on the flesh of wild animals.

We spent four days at Yenangyoung, and so difficult and confusing is the country, that even with our previous knowledge

* The map published in the 'Memoirs' of the Geological Survey of India, vol. xxvii. part 2, on "The Occurrence of Petroleum in Burma, and its Technical Exploitation (Noetling)," is reduced from the original, and No. 42 is not marked on it.

of the locality, and the help of map and compass, we had great difficulty in placing ourselves on the spot indicated on the map as No. 49. The whole country is so closely furrowed with ravines, into and out of which it is necessary to scramble constantly in order to make any progress, that it is almost impossible at times to maintain a fixed direction, and very difficult to identify quickly any of the minor features in the map with the locality.

The great feature, however, which there is no mistaking, and which was of chief importance to us, is the dull red band of ferruginous conglomerate that surrounds the oil-field, and in which Dr. Noetling found his flint chips. This bed is called by Dr. Noetling the zone of *Hippotherium antelopinum*, and is thus described by him on p. 87 of the 'Memoirs,' vol. xxvii. part 2:—“ This zone forms a well-marked horizon in the sequence of the strata, and crops out in the shape of an elongated ellipse, the long axis of which measures two and quarter miles, while the short (transverse) axis amounts to slightly over a mile only.”

In fact, the beds here, including this zone, have been raised from their original horizontal position by pressure on all sides into a long turtle-back dome, and then the crown of the dome has been shaved off, leaving their edges exposed all around the area of it.

The theory of Dr. Noetling is that the chipped flints belong to the zone of *Hippotherium antelopinum*, and to *nowhere else*, and that in this zone they are “not rare.”* The remains found in this zone indicating a Pliocene, and perhaps even a Miocene age, it follows, if the above theory is correct, either that a considerable Pliocene population existed who made the chips, or else that these are natural pieces, and not the work of man. This alternative has probably induced many to reject the former as improbable, and, against their better judgment, to hold that the chips are natural.

But what becomes of the theory if they can be picked up, as Mr. Oldham says, on the plateau anywhere, quite apart from the zone of *Hippotherium antelopinum*? And what if, when picked up by scores, as they can be, some two hundred feet above the said zone, they can in some instances be fitted together again,

* ‘Records,’ vol. xxvii. 1894, part 3, p. 20.

and, in the majority of cases, can be with fair certainty grouped into families belonging each to a separate original store, thus proving that they are chips belonging to flints which were broken up at the spot where they are now found undisturbed? If the chips have no connection with the Pliocene stratum, the difficulty occasioned by their numbers and fitting together is got over, and there is no necessity to do violence to one's feelings by supposing that in some way or other the original flints must have got chipped up spontaneously.

On the first day we went from Thittabwe to Minlin Hill, round the northern and eastern sides of which the ferruginous conglomerate crops out, and began by examining the bed there, as it is clear that, if chipped flints are a feature of this bed, they may be found scattered throughout it, and not only at one definite spot. Finding nothing, we searched Taung-ni-gale (the small red hill), to the east of Minlin, where the conglomerate outcrops on the surface, and where Dr. Noetling had previously found some poor specimens; but we were again unsuccessful. We then proceeded in a northerly direction, towards No. 49, crossed the Ye-dwin-aing Yo (a "Yo" is described in Stevenson's Dictionary as a blind watercourse), and kept on till we calculated we were somewhere near No. 49. As it subsequently turned out, we were still a little to the south of it, when we stopped and examined the conglomerate (which here runs in a general north and south direction some fifty feet below the edge of a ravine), and picked up a few rolled fragments of bone, and (in a small yo) a few specimens of *Batissa crawfurdi*, which had apparently rolled down the steep bank. As the day's work, we had examined the conglomerate carefully from Minlin Hill almost up to No. 49.

On the second day we crossed the oil-field from west to east by the cart-track that leads by the gas-well, and continued on till we came to where the conglomerate crosses the road at right angles on the east side, and spent the day searching the conglomerate both north and south of this place, but chiefly to the north, where it looked more promising. It continues to run here some way below the edge of a ravine, and can be searched without much difficulty. All this part was obviously in the vicinity of No. 49, and, so long as we stuck to the conglomerate, it did not seem to matter whether we were on the identical

spot or not. Beyond some rolled fragments of bone we found nothing.

On the third day (Christmas Day) we started on the same route, but stopped short at the conglomerate on the western side, and examined it for a considerable distance in both a northerly and southerly direction, especially where it outcrops by the side of the road leading north into Bene village. Again we found no signs of flints. Some rolled fragments of bone were all that had up to now rewarded our efforts, though we had examined a considerable portion of the bed in different localities. We found the nature of the conglomerate to differ in different places, as noted by Dr. Noetling at p. 59 of the 'Memoirs,' vol. xxvii. part 2, where he says :—"At some places it is a rather incoherent agglomerate of irregularly shaped concretions of a ferruginous clay, at others it contains numerous quartz pebbles cemented by a hard conglomerate sandstone, at others again it is an earthy iron ore of a bright red colour." But, whatever the nature of the conglomerate, it was apparent that had any foreign substance, such as flint chips, been exposed on its surface, or lying out on the numerous slopes where the detritus of the bed was spread out, as if on purpose, we must have found them, at any rate, as easily as we found the numerous fragments of bone.

On the fourth and last day of our visit we determined to make an effort to locate No. 49 precisely, in case there might be some quite local feature which did not exist elsewhere, and we therefore crossed the oil-field, as on the second day, and, on coming to the eastern side, sent the cart up on to the plateau beyond, with instructions to turn southwards, following the course of the ravine, and stop at about the place where we calculated that it would be opposite No. 49 ; while we also went southwards, but kept down in the ravine, searching the conglomerate, and the slopes below it. By breakfast-time we had joined up our first and second days' searches, and had found nothing beyond the usual rolled fragments and a few pieces of a tooth, apparently *Aceratherium perimense*. Above the conglomerate, however, we found a bed composed of innumerable shells of *Batissa crawfurdi*, such as is mentioned by Dr. Noetling as occurring near where he found the flints. We both agreed, judging from our present position and distance from Minlin Hill,

as well as from our first day's work, when we had approached from the opposite direction, that we were as near No. 49 as we could ever hope to be, and that the locality answered with sufficient accuracy to the description and drawing given by Dr. Noetling. It was, of course, impossible to be wrong except in a north and south direction, as the ferruginous conglomerate is unmistakable, and occurs only once on the eastern side, and, as we had estimated the distance with the map both from Minlin Hill and from the cart-road to the north, we could feel fairly certain of the exact spot. We breakfasted on the plateau, about one hundred and fifty yards back from the edge, and afterwards, while I was endeavouring to fit together the fragments of tooth I had found, Col. Nichols walked a little farther to the east over the plateau to survey the direction of the "yos," and returned with a handful of flint chips which he had picked up on the plateau not thirty yards off. They were very irregular pieces, and not at all promising, but they were at any rate flint chips, and we instituted a search on the spot, assisted by our Burman servant and the cart-man. Within a radius of about fifty yards we found a considerable number of pieces of different sizes and shapes, from large rough lumps almost as big as the fist down to little shavings; and, as they were easily seen lying on the brown earth among the short dry grass, we managed to collect, within half an hour or so, a cartridge-wallet full. Unfortunately, it seemed to us at the time so unlikely that these pieces should really be identical with those considered by Dr. Noetling to be Tertiary flints, that we did not notice many details as to how they were lying which might have been useful. We noticed, however, that the pieces were most numerous in the centre of the area, and quickly grew less common at the outside, and after a little ceased altogether. The larger pieces were all, I believe, found somewhere near the centre of the area. The impression we got at the time was that some lumps of flint had been either found or brought there, and had been broken up on the spot for some purpose, and that what we had found were the remains of that operation. We did not examine them very carefully at once, but detected one or two cores, and one or two pieces that might have been rough implements.

Having collected all we could without a very prolonged search

in that one area, we proceeded towards the edge of the ravine, some one hundred and fifty yards off to the west. For some distance after the flints had ceased there were no stones or other objects to be found on the ground, but when getting towards the edge we found a few quartz pebbles, which became more numerous, and which we discovered came out of a band of very dark conglomerate which outcrops and forms the edge of the ravine just there, having withstood the action of the weather better than the soft sandstone. This conglomerate was about fifty feet above the ferruginous band, and appeared to be quite local. All the strata there dip to the east at a very considerable angle, and the dark conglomerate would therefore be a long way below the surface at the place where the flints were found, one hundred and fifty yards away; while, at the same place, we calculated that the bed of ferruginous conglomerate would be at least two hundred feet below the surface.

There is thus no possible connection between the conglomerates (least of all the ferruginous conglomerate) and the flints which we found; and, though it might be suggested that they came out of some higher band which had worn down, leaving them on the surface, the circumstances under which they were lying grouped together—evidently the chips from stones broken up on the spot—point to a different conclusion.

There can be no doubt of the identity of these chips with those described and figured by Dr. Noetling. Mr. LaTouche, who has examined both, tells me that they are exactly alike in appearance, and he cannot detect any difference. They have the same porcelain glaze, are in the same condition, and they were found (though not in the ferruginous conglomerate) in the immediate vicinity of the spot where Dr. Noetling found his. Two or three of our specimens are, Mr. LaTouche says, better than any of those found by Dr. Noetling, and more clearly intended for some purpose such as arrow-heads.

An examination of them shows that they may be roughly divided into irregular lumps and thin flakes. The stone itself is chert, or impure flint, and I do not know for certain from where it was brought. There were no other stones at the place where the pieces were found. There is one obvious core, and there are at least three specimens which seem to be more or less finished

arrow-heads. One specimen in particular has been skilfully chipped into a very symmetrical arrow-head without any unnecessary work—and, indeed, with a minimum of labour—showing that considerable skill had been acquired and utilized in producing such an object. The great similarity between this and at least two other specimens would seem to show an evident design, and that the chipping was done with the object of producing instruments shaped like this. No doubt the more perfect or finished specimens were carried off; but those that are left, together with the miscellaneous chips and the lumps of original flint, are sufficient to show what was the purpose in hand. Each specimen has one flat surface, with a bulb of percussion, showing that it was deliberately struck off a larger piece; on its other surface is the angle usual in flint flakes, and this angle has—in two specimens, at least—been broken down at one end as if to fit into a handle. There is a good point, and the whole object would form a very serviceable arrow-head. I cannot help thinking that specimen No. 1 at least is a finished one, and that it represents a fair type of the work of the men who made it, and was accidentally left behind. It does not require any more finishing—secondary chipping at the edge would be superfluous—and the only improvement would be further trimming at the base.

Many people have thought, from Dr. Noetling's specimens, that these are natural chips, but I think that is chiefly because they have felt constrained to believe that they were embedded in a Tertiary stratum, and that when it is shown that there is no connection between the two, and that they may be the work of ordinary Palæolithic man, common sense will show that these stones cannot have chipped themselves up in this manner, still less have fashioned themselves into symmetrical shapes with bulbs of percussion and angles complete.

It is clear that these chips do not come from the ferruginous conglomerate, and I cannot see what difficulty there is in believing that some dropped over the edge of the ravine on to the ledge where Dr. Noetling found his. Certainly none of those from the particular area which we found could have so dropped; but if, as Mr. Oldham says, they occur anywhere on the plateau, there are doubtless many other areas of them, and

Dr. Noetling might easily have picked his up just underneath one of these. The edge of the ravine, though sometimes nearly perpendicular, does not overhang, and, with a ledge of conglomerate such as Dr. Noetling figures, it is certain that stones, dropping over as the edge wears away, might be caught on it. We were unable to look about on the plateau for further groups of chips, as we had to leave Yenangyoung the next day, and thought it only right to spend the rest of our fourth day in a further careful examination of the ferruginous conglomerate in the vicinity—but, as usual, without result.

Besides dividing the flints into irregular lumps and flakes, they can be grouped according to the original stones from which they came. In some instances this can be done with certainty, as, for instance, one stone was a peculiar flint breccchia, of which we found three pieces; while in very many instances the likeness in colour between several pieces, even down to small peculiarities—such as pink spots or white streaks in the stone—is such that no reasonable doubt can be felt that they come, not only from the same stone, but from the same part of it. In two instances I have been able to fit pieces together, proving definitely that they were broken *in situ*, and in many other instances it is doubtful whether pieces do not fit. These facts seem to me to be against such extreme antiquity as is claimed for these flints by Dr. Noetling, and especially against the theory that they were once embedded in a stratum of rock or earth, and have been left lying on the surface by the wearing away of the stratum. To believe this one would have to believe that they were originally chipped up in Pliocene times, were subsequently covered up by sand to a great depth, the beds were then raised into a dome by pressure, and finally the pieces of stone were again exposed on the surface by denudation without any disturbance of their original relative positions!

But if the flints are not associated with the conglomerate, what are they? I would prefer that this question should be answered by those more competent to give an opinion, but Mr. LaTouche thinks they must be of considerable age, owing to the glaze on them, and suggests that they are palæolithic. On breaking two pieces, they were found to be light-coloured throughout, and not of the dull black colour characteristic of true flint;

but, following the outline of the pieces, there is a distinct "skin," or line of weathering, about one-sixteenth of an inch in depth, of a lighter colour, showing considerable lapse of time since the original stones were broken up.

In his 'Prehistoric Times,' Lord Avebury points out, on p. 329, with regard to flint flakes, that "those which have lain in siliceous or chalky sands are more or less polished, and have a beautiful glassiness of surface, very unlike that of a newly broken flint. In ochreous sand, especially if argillaceous, they are stained yellow, whilst in ferruginous sands and clays they assume a brown colour, and in some beds they become white and porcelainous." Now, these pieces are nearly all either almost white or light cream-colour, though some are about the colour of honey; whereas, had they lain in the red band of conglomerate since it was deposited, they would surely have been much darker. As a matter of fact, in nearly every instance in which a piece of the exterior of the original stones is found, on a flake, it is seen to be yellow or orange, sometimes brown, and this might give a clue as to where they came from.

There is a plateau gravel at Yenangyoung which contains large rounded stones, but we could not give much time to searching in it for pieces of flint; and, though I picked up a piece by the side of a cart-track, I did not at the time connect it with flint chips, and threw it away, and was unable to find it again. There is apparently no reason why the lumps of chert found on the plateau should be brought from any distance over a mile or two to the spot where they were broken up, and a further search in the neighbourhood would no doubt disclose the source of them. Mr. LaTouche has taken a few of the pieces for microscopic examination as to their composition.

As I have already mentioned, Mr. Oldham and others regard the pieces found by Dr. Noetling, which are now in the Geological Museum in Calcutta, as natural; but, as an answer to this, in the year 1897, Dr. Noetling published, in the 'Records of the Geological Survey of India,' vol. xxx. part 4, p. 242, an article entitled "Note on a worn Femur of *Hippopotamus irrawadicus*, Caut. & Fale., from the Lower Pliocene of Burma," in which he figured and described a very fine unbroken femur, exhibiting at both ends "traces of a peculiar kind of grinding." He says he

found it in a small streak of the conglomerate, about fifty feet above the ferruginous conglomerate (zone of *Hippotherium antelopinum*), and about a quarter of a mile north of where he found the flints. He says that it was no doubt *in situ* when found, and that it took some time to free it from its resting place in the bed. This find was made while he was mapping the petroleum field at Yenangyoung, and was mentioned by him for the first time in 1895, in his paper on the Tertiary system of Burma,* when he described the facets on the bone as a natural result; and said, "That side on which the bone rested was considerably rubbed, thus indicating the result of friction on the underlying sand produced by the gentle rocking of the bone by the waves while lying on the beach." Subsequently, in 1896, he saw a figure of a scapula of *Equus* which had been similarly rubbed down, and which Prof. Dames considered to have been rubbed by human agency, and, in his article in 'Natural Science,' in 1897—referred to early in this article—he first suggested that the bone he had found was probably an additional witness for the Tertiary origin of the chipped flint flakes, but he gives the layer in which he found it as being "fifteen to twenty feet, perhaps a little more," above the zone of *H. antelopinum*, instead of fifty feet, as stated in his article in 1897 in the 'Records.'

Whichever may be the correct distance above the bed, it is clear that, as the bone was pulled out of the layer in which it had up till then been undisturbed, there is no necessary connection between it and the flint chips which, as we now see, are to be found lying out on the plateau far above the conglomerate. In fact, if, as seems to me, the flints could not have come from this bed, the bone cannot possibly explain their origin.

Dr. Noetling says, in favour of this bone, that at any rate there is no similar wearing away of substance to be observed in any of the hundreds of specimens which he collected at Yenangyoung, nor in the collection of Siwalik remains in the Museum of the Geological Survey; so that "it is therefore beyond doubt that, whatever the verdict may be as to the origin of these curious facets, the specimen here described is at present unique."

I have already mentioned earlier in this article that on our first visit to Yenangyoung we found, among other remains, an

* 'Records of Geological Survey of India,' 1895, vol. xxviii. p. 77.

upper premolar of a small species of *Rhinoceros*. This specimen, which is being sent to the Natural History Museum at South Kensington, together with the collection made by Col. Nichols and myself at Yenangyoung and Mandalay, was brought to us at Twington village by a Burman oil-well owner. Oil is the only industry there, and certain tracts are reserved for native owners to work by their primitive methods. They are not allowed to drill by machinery, but they dig wells and get oil at about three hundred feet. On asking whether they do not sometimes come across fossils, one man produced the above tooth, saying that he had found it at about one hundred and fifty cubits down, and he had never found anything else. The specimen is black, and beautifully polished from lying in the oil-sands, and on one side it had been rubbed down on some level surface, producing facets on three separate prominences. There is, however, no question in this case, as the man said he had rubbed it down himself to find out of what it was made. He apparently did not know it was a tooth, but kept it as a curiosity. I do not, of course, suggest that the femur was rubbed down in this way, but it is no longer unique; and, if Dr. Noetling is by any chance in error in supposing that it had not been previously disturbed when he found it, there is always the chance that it came by its peculiarities in this way.

Now as to this, surely the most remarkable thing about the bone is that it should have remained intact—that is, unbroken—in a stratum in which, so far as I know, all other bones are reduced to rolled fragments. The femur of a *Hippopotamus* is not a small bone by any means, and if such animals as *Rhinoceros perimensis* and *Hippotherium antelopinum* are represented in the conglomerate only by isolated teeth and fragments of bone, how comes it that this bone alone exists unbroken? And the difficulty is not made less by the consideration that this very specimen, thus curiously preserved, is found to be one on which Tertiary man has been exercising his ingenuity. I am aware that Dr. Noetling found it in a subordinate patch, either fifteen or fifty feet above the zone of *H. antelopinum*, and not in that zone itself, but he himself describes such patches as made up of "small pieces of drift-wood fossilized into hydroxide of iron, small pebbles of white quartz, or of a ferruginous claystone, and rolled

fragments of bones"; so that, if this description is correct, a complete *Hippopotamus* femur would seem rather out of place.

The numerous rolled fragments of bone found by us in and around the red conglomerate vary in size from the size of a finger-tip to half the palm of the hand, and throughout our search we found nothing like a complete bone. Before commencing this article, however, I wrote to Dr. Noetling, mentioning this difficulty, and asking what was his explanation of it; but, having received no answer, I can only conjecture that no very satisfactory one is forthcoming. It would appear to be not difficult to determine whether the rubbing down took place before the bone was fossilized or after, but Dr. Noetling does not mention that this test has been applied. Mr. LaTouche searched for the specimen in the Geological Museum, as Dr. Noetling was absent in Europe, but could not find it in the place where it should have been, and, as the latter gentleman, at the time of writing, is in Cashmir, there must be some further delay in finding it.

However, the bone at best is only useful in support of the flints, and if these have a different origin it cannot support them, but must remain as a solitary and inconclusive specimen.

That some sort of man existed in Burma—or, at any rate, in the Malay Peninsula—in Tertiary times is not only possible, but probable; but that the chipped flints and facettted bone are the work of his hands is, I think, a conclusion that is not warranted by the facts. The place where the flints were found would appear to be a palæolithic workshop, and as such is of great interest; but the vast difference between such a find and a discovery of specimens of the work of pre-glacial man is too obvious to require mention.

The photograph for this article has been kindly taken for me by the Rev. Charles Hodder, Town Chaplain, Mandalay.

Since writing this article, I have heard that some of the flint chips that were taken to England by Col. Nichols have, through the kindness of Col. Bingham, been submitted to Dr. Blanford, Prof. Bonney, and other expert authorities, and that they are pronounced to be of undoubted human origin.—R. C. J. S.

ON THE SPECIFIC VALIDITY OF *ANSER GAMBELI*
 (HARTLAUB), AND ITS POSITION AS A BRITISH
 BIRD.

By F. COBURN.

FULLY realising the great importance which attaches to the introduction of a new species of bird to the lists not only of Great Britain, but Europe as well, I have not committed myself to the following observations and conclusions without mature study, and shall treat the subject with a minuteness of detail befitting its character.

At the meeting of the British Ornithologists' Club in October, 1901, when I exhibited a series of my Icelandic birds, I also submitted my specimen of *Anser erythropus* (*ante*, 1901, page 317), and an almost completely black-breasted example of what I then thought was *A. albifrons*.

In my collection I have another specimen of this stage, which I secured from Co. Mayo many years back, and which has the whole under parts much blacker even than the former one, being a glossy jet-black, practically without any admixture of drab.

Both birds had been a puzzle since they came into my possession, and this largely influenced me in taking my specimen to London with *A. erythropus*, as I expected to find similar birds at South Kensington, and thus receive enlightenment. I was, however, much surprised to hear from the courteous authorities at the Museum that they had never before seen a specimen like mine! and that *A. albifrons* was not known to assume entirely black under parts. It was vaguely suggested that my specimen might be *A. gambeli*!

Subsequently, at the request of Mr. J. H. Gurney, I sent *A. erythropus* and this black-breasted bird for his inspection, also to be exhibited before the Norwich Naturalists' Society. Mr. Gurney expressed to me his opinion that this black-breasted bird might be *A. gambeli*, and has since published this view in

the able article, "On *Anser erythropus* and its Allies," in the current issue of the 'Ibis' (cf. 'Ibis,' 1902, pp. 269-275).

On studying this subject later, I found that there was much diversity of opinion amongst authorities as to the specific validity of *Anser gambeli*, the bird having been separated from *A. albifrons*, and so named by Hartlaub as far back as 1852; and, although his diagnosis has been questioned by several ornithologists, there appears to have been no real effort made to settle the point during all these fifty years.

I must confess that when I first examined the series of skins at South Kensington I was much puzzled, and felt that, with such a series, it would be extremely difficult to discriminate between the two species. I may here say that I consider the series in the National Collection to be inadequate and not a representative one, there being but very few specimens, mostly, if not all, in the winter condition of plumage. Although I have examined the series of both birds twice, they have afforded me very little assistance.

Later, I got together my entire series of White-fronted Geese, and have devoted the bulk of the past winter season to a study of this subject. I have been lucky in securing many examples to fill gaps in my series, and have now sixteen carefully selected specimens to work upon, these providing ample material in my judgment for proving two important facts, viz. the specific validity of *A. gambeli*—it must not be regarded as a subspecies—and its frequent occurrence as a British bird; the whole of my sixteen specimens of the two species having been received from the west coast of Ireland at different times.

Most authorities agree that the chief distinguishing characteristics between *A. albifrons* and *A. gambeli* are, the larger and heavier bill, and darker under parts of the latter. I have found other characters which I will state later; but, taking this longer, broader, and generally heavier-built bill as my guide, I could easily separate the two birds, and make a series of ten *A. gambeli* and six *A. albifrons*.

Unfortunately, I lack some of the connecting links in the latter bird; I have seen them in years past, and remember them well, but did not secure them, not knowing at the time that I was collecting two species of birds. I shall meet with those

connecting links later, and probably next season. One reason why my series of *A. gambeli* is so much more perfect than that of *A. albifrons* arises from the fact that, out of the great numbers of White-fronted Geese which have come under my notice, I have been in the habit, fortunately, of selecting only striking-looking birds, leaving the ordinary run to be secured at any time.

I shall now endeavour to show that these large-billed, heavily barred, or striking-looking immature birds should all be regarded as specimens of *A. gambeli*.

This series of ten specimens is a singularly, and I may say valuably complete one, ranging from the first plumage, through almost every grade, up to the breeding bird with glossy black under parts.

Now, it is in the two extremes—the immature and breeding stages—that it is most easy to discriminate between the two species, so far as plumage goes; in the intermediate or winter stage it is more difficult, as the student has then to rely mainly upon the differences in the size of the bill, a slightly longer tarsus, and, as my series shows, the distinctly lighter colour of the extreme outer wing coverts; this latter runs practically through the whole series, but perhaps too much importance must not be attached to it. There is another, and I consider very important osteological character, which I have discovered, and which cannot be detected unless the bird is in the flesh, but this I shall refer to in its proper place.

I believe that this similarity in the winter plumages of the two species—the stage most readily procurable by collectors—and the fact that there is no full, or in any way complete description published of the immature, or breeding stages, has led to much confusion, and caused the bird not only to be overlooked as a British species, but its specific validity to be doubted.

Because large-billed specimens have been procured in Great Britain, it has been concluded that they must belong to *A. albifrons*, and therefore that this bird has sometimes a bill quite as large as *A. gambeli*. If those British-killed, large-billed specimens in various collections were admitted, as they should, to be *A. gambeli*, much confusion would have been avoided.

My series demonstrates clearly the very important fact that the immature conditions of the plumage in *A. gambeli* are quite

distinct from the same stages of *A. albifrons*; and, as I have before said, I can find no proper description of these stages, it will be necessary in proving my case to publish a full but brief description of these and the other leading features in my two series of birds. I ought perhaps to say that the stock of books available to me here is limited—I particularly lack American works—and I should like it to be understood that I do not positively assert that no proper description of these stages of plumage has ever been published, but that I cannot find any.

Anser gambeli.—Immature male, first plumage. Shot Co. Galway, end of November, 1895.

The immature plumage of any of the Wild Geese may always be known by the small size of the feathers clothing the body; in first plumage the feathers are not half the size of those of an adult bird. The feathers gradually increase in size as the bird advances towards January and February. With the growth of these feathers there is a change in the colouring matter, independently of a moult. But when the black feathers begin to appear on the breast, they are frequently, but not always, newly moulted feathers. I have plenty of evidence showing the black colouring matter being transmitted into drab feathers; indeed, this deposition of the black pigment goes on slowly until the whole under parts become jet-black. In the case of the immature birds, of *A. gambeli* especially, advancing towards maturity, it is first a gradual extraction of the dark colouring matter from the feathers, eventually leaving the breast and under parts almost if not quite white; then the full drab colour of the adult bird gradually deepens, and with it the black colour begins to appear. As I have before said, these changes are accompanied by a moult, and probably by the time the breeding period comes round the whole body has been clothed in new feathers.

I have given these general facts here, as it will be necessary to keep them in view in connection with the following descriptions.

The general appearance of this bird's first plumage is a very dark blackish brown; but compare this first plumage with the black-breasted breeding stage, and it is easy to see that this young bird belongs to a parent who finds black under parts useful to it as a protective colouring during the breeding season.

As the same conditions of environment prevail when the young bird has got his first feathers to those of the breeding period, it is equally necessary for the young to be darkly clad. We find plenty of instances of this in the cases of the various kinds of Ducks, Guillemots, Razorbills, Dunlins, and other shore birds, where the first plumage after the downy stage closely resembles that of the adult breeding-dress.

The whole of the under parts, then, in this young bird, from the breast to the abdomen, are a deep blackish umber, fringed with pale drab. The flanks not quite so dark in colour, but fringed with a darker drab. The mantle is dark umber, with pale, faded brown margins; rump very dark umber; upper tail-coverts—central ones dark umber, fringed with dirty white; outer ones dark umber on one side of the rib, dirty white the other. Tail blackish umber, margined with dirty white. The forehead extending to the eyes; loral region and front cheeks a dull black, with a few indistinct white feathers scattered around base of bill and forehead; the rest of the head and neck a dark drabish umber, darkest on top and back of neck; the front lower neck a lighter drab. The wing-coverts graduate from the slaty drab of the extreme outer ones to the blackish umber of the medians, faintly fringed with paler; the primary coverts are a slaty umber, broadly margined with white. Primaries blackish umber, with white shafts; secondaries almost black with a very delicate hair-line margin of drab. The alula and base of primaries slaty drab. Abdomen and under tail-coverts dull white. The legs, toes, and webs a pale chrome-yellow, with a tinge of umber. Bill a dirty whitish yellow with a few streaks of blackish on ridge and side. Nail whitish at base, blackish at end streaking into the white. Iride dark hazel; eyelid brownish yellow.

Length $29\frac{1}{2}$ in.; weight 5 lb.; bill 1.98 in.; tarsus 2.75 in.; wing $15\frac{3}{4}$ in.

Anser albifrons.—Immature male, just beginning to pass from first to second stage. Shot Co. Mayo, January, 1892.

It is a pity I have not got the absolutely first plumage of this bird; however, the only traces shown of the second stage are a few large feathers on the flanks, and a larger sprinkling of white on the forehead; it may practically be taken as a first-plumaged

bird, and it at once gives us a totally distinct-looking appearance to the first specimen or any other immature stage of *A. gambeli*. Here we have a bird whose parents do not require entirely black under parts for the breeding period! The whole of the under parts, from the breast to the abdomen, are a pale stone drab fringed with lighter, and becoming almost white towards the abdomen. None of these feathers shows the slightest traces of having had the dark colouring matter in them which is to be found up to the fourth stage in *A. gambeli*. The flanks are a darker drab with pale margins. The mantle is pale umber margined with drab. Rump blackish umber; upper tail-coverts much paler than in *gambeli*, being a washy brown and dirty white. The tail is very like that of *gambeli*, but a paler tint of dark umber. Round the base of the bill and under the throat a fair space of dirty white feathers interspersed with blackish ones; forehead and front cheeks blackish, but in no way as dark as the other bird; head and neck a dark rusty drab, darkest on crown and back of neck. Outer wing-coverts slaty drab, gradually darkening into deep umber margined with paler of the medians, and slaty drab broadly margined with dirty white of the first coverts. Primaries dark umber but with a light hoary shading, secondaries nearly black. Alula and base of primaries a hoary slate. Abdomen and under tail-coverts dirty white. There was not sufficient difference in the colours of soft parts in these two birds to induce me to make special notes, and I find that in my manuscript book which I keep for recording colours of soft parts the one description answers for both birds; but the legs and bill look much paler now than those of the first specimen. The ridge of the bill shows traces of dark markings, and the nail is partly brown and dirty white. I did not take length and weight of this bird before skinning. Wing 15 in.; bill 1·85 in.; tarsus 2·45 in.

Anser gambeli.—Second, third, and[°] fourth stages. From birds shot in Clonmel and Galway, November, 1901, February, 1895, and January, 1902.

I can now take these three stages more briefly. In the second stage—male—one can unmistakably see the commencement of the fading away of the dark colouring matter which

characterises the first plumage. In this bird the under parts have become a dirty-looking umber; on the upper part of the breast there are a few feathers left marbled with blackish umber, these alone showing clearly enough that it is a case of the extraction of the dark colouring matter. The upper breast is drab, with the edges of the feathers worn and abraded-looking. The flanks have a few of the dark large new feathers coming, bordered with dull white. The general appearance of the upper parts is paler than in first plumage, the bill is clearer, and the nail nearly all white. Bill 2·13 in.; tarsus 2·65 in.; wing 15½ in.

In the third stage the under parts have now assumed that appearance which the Americans call "speckle belly," the dark markings having so far faded away that the centres only of the feathers remain dark, making the under parts look as though speckled all over with dark umber. It is not necessary to describe any other portions of this bird's plumage, excepting that there is scarcely a trace of white at the base of the bill, and the blackish has a rusty look.

Male.—Length 28¾ in.; wing 16 in.; weight 5½ lb.; bill 2·13 in.; tarsus 2·93 in. The nail on bill is entirely dark.

The fourth stage is very interesting; it is still a "speckle-belly," but the clean-looking new greyish drab feathers are appearing on the upper breast and amongst the under parts, which are becoming almost white, while some of the old feathers have almost entirely lost the dark centres, giving a much whiter appearance to the under parts, which makes the speckles show up more distinctly. The flank feathers are well grown, and have broad white outer margins. The upper tail-coverts have become almost entirely white. There is a good space of white at the base of the bill, which is clearer yellow with the nail partly white. In the wing this bird shows the paler slaty drab outer wing-coverts, which runs through the rest of the series, becoming palest in the black-breasted adults, and in this differing distinctly from the adults of *A. albifrons*.

Male.—Length 28½ in.; wing 16½ in.; weight 5¼ lb.; bill 2·1 in.; tarsus 2·95 in.; neck 8¾ in.

Anser albifrons.—Fourth stage. Shot, Galway, February 8th, 1902.

It will be observed that I lack stages two and three in this bird. But my first specimen gives me first and some of the second characters, while the present, which is a very interesting bird, gives me the fourth and some of the fifth. Compare this bird with the fourth stage of *A. gambeli*, and the general tone of colouring will be found to be quite distinct. Instead of the under parts becoming almost white, as they do eventually in the larger bird, in this they are a stone drab down to the abdomen, which is certainly a very important distinction. On the under parts there is a moulted black feather here and there, drab ones with the black colouring being thrown into them, and a few with the darker drab of the first plumage not all extracted. *There is no trace of this bird ever having been a "speckle-belly."* On the head and neck there is more of a slaty tinge. The mantle and outer wing-coverts are much darker. There is a broad space of white at the base of the bill, which also extends low down under the throat; but there may be a tendency to albinism in this bird, as there are a few white feathers scattered on the neck; nevertheless, it is as well to point out that the white extends under the throat in the first plumaged bird, but is not traceable in any of the immature specimens of *A. gambeli*.

Female.—Length 26 in.; weight $4\frac{1}{2}$ lb.; wing 15 in.; bill 1.80 in.; tarsus 2.52 in.; neck $7\frac{1}{2}$ in.

Anser gambeli.—Sixth, seventh, eighth, and ninth stages. Shot, Galway, February 14th, 1902; January 20th, 1902; February 19th, 1902; and Mayo, January 18th, 1892.

In the fifth stage of this bird, which I miss in my series, but am well acquainted with, the whole of the under parts have become a dull white, with a black feather showing here and there.

In the sixth stage the drab colouring matter—now pale—has been thrown into the previously white feathers of the under parts; large patches and broken bands of black are appearing as the result of moult combined with the deposition of the black pigment. It appears to me that up to this sixth stage the bird

has got new feathers on all parts of its body, so that all the important subsequent changes are a result of the continued deposition of the colouring matter into the feathers. In this specimen there is an extraordinary amount of white on the front of the head extending beyond the commencement of the eyes. Dissection proved it to be an immature male.

Length 28 in.; wing $16\frac{1}{2}$ in.; weight 5 lb. 2 oz.; bill 2·17 in.; tarsus 2·91 in.; neck 9 in.

Seventh stage. The drab of the under parts has become more pronounced, while the black has greatly increased, and now forms almost unbroken bands across the lower parts; great numbers of the drab feathers have the black pigment being thrown into them.

Adult male.—Length 29 in.; wing 18 in.; weight 5 lb.; bill 2·24 in.; tarsus 3·0 in.

In all these four stages the colour of the soft parts is much deeper than in corresponding stages of *A. albifrons*, being of a distinct deep reddish orange. In some the entire bill is a bright orange scarlet, the nail also being suffused with red while the bird is quite fresh. The brilliancy of colour in the legs and bill appears to increase as the bird nears the breeding stage. Tongue and inside mouth white. Eyelid yellowish umber.

Eighth stage. All that need be said here in connection with this bird is to note the largely increased amount of black on the under parts, which extends almost to the vent, and has ceased to form bars; they are great patches with drab feathers interspersed.

Female.—Length $27\frac{1}{2}$ in.; weight (a thin bird) $4\frac{1}{4}$ lb.; bill 2·1 in.; tarsus 2·75 in.; wing $16\frac{1}{2}$ in.; neck 9 in.

Ninth stage shows a still further increase of black on the under parts, and leads up directly to the final two breeding birds.

Female.—Length and weight not taken; wing $17\frac{1}{2}$ in.; bill 2·1 in.; tarsus 2·85 in.

Ansér albifrons.—Sixth, seventh, and eighth stages. Shot, Galway, January 25th, 1902; January 14th, 1902 (two).

In the sixth and seventh stages of this bird it is very evident that the under parts had become much paler than in the fourth

stage before the black colouring matter began to appear; but in no case anything near as white as in *gambeli*. In the seventh stage the drab is appearing, in the eighth it has increased in intensity, as have also the black markings. In all these three the black markings are much less than in the *gambeli* series, and in all cases completely broken by the drab feathers. In this it will be seen that my observations agree perfectly with those of other writers. In all these birds the outer wing-coverts are much darker than in the series of *gambeli*.

The legs and toes are a bright orange yellow. Bill pale livid yellow. Nail shining white with a tinge of slate. Iride dark hazel, and eyelid *dark drab*. The measurements and weights of these I give in order:—Length $27\frac{1}{2}$ in.; wing $16\frac{1}{4}$ in.; weight $5\frac{1}{4}$ lb.; bill 1.85 in.; tarsus 2.60 in.; neck $7\frac{1}{2}$ in. Length $27\frac{1}{2}$ in.; wing 16 in.; weight $5\frac{1}{4}$ lb.; bill 1.80 in.; tarsus 2.60 in. Adult female: Length 27 in.; wing $16\frac{1}{2}$ in.; weight $5\frac{1}{2}$ lb.; bill 1.80 in.; tarsus 2.65 in.

Anser gambeli.—Tenth and eleventh stages. Shot, Co. Mayo, February 6th, 1901, and February, 1894 ?.

It remains now to describe the two last and most important stages in this bird. The breeding bird with entirely black under parts is exceedingly rare in collections, and I think has never been fully described, even by American writers! Audubon ('Birds of America,' vol. vii. p. 209) had evidently heard of such a plumage but not seen it, as he says: "Feeling pretty confident that in summer the lower part of the body becomes pure black." Dr. Elliot Coues ('Key to North American Birds,' p. 684) says, "in high plumage perhaps mostly black," so that he had never seen the bird, and probably only copied Audubon's indecisive remarks. The only references I can find amongst British writers are in Ussher's 'Birds of Ireland,' p. 170, and the late John Cordeaux in 'British Birds, their Nests and Eggs,' vol. iv. p. 591, who refers to a specimen in the collection of Mr. G. H. Caton Haigh; but both writers regarded these birds—which were obtained from Ireland—as being *A. albifrons*. If Mr. Ussher and Mr. Haigh will kindly examine their specimens, they will probably find that they are of the large-billed race.

In treating of the ninth stage I said that the black had increased so much that it led directly up to this tenth stage. In this the black covers the whole of the under parts and flanks from the lower neck to the abdomen, being interspersed here and there only by a single drab feather; the flanks show most drab, but it can easily be seen that the black colouring matter is being passed into these feathers. The other portions of the bird, from the head to the mantle, have also become much darker, but the outer and greater wing-coverts have become of a paler slate, while the median coverts are darker than in preceding specimens. Length $26\frac{1}{2}$ in.; wing $15\frac{1}{2}$ in.; weight 5 lb. 2 oz.; bill 1.95 in.; tarsus 2.62 in. In the eleventh stage it need only be said that the black has still further intensified, become more glossy, extends entirely over the flanks, the outer feathers of which have broad white margins, and that there is only just a trace of drab left. It is quite certain that if the bird had lived a few weeks longer there would not have been a solitary trace of drab left.

It is quite clear to me that these birds select for their breeding site a spot where there is *black sand and scattered lumps of black lava with portions of the surface weathered drab!* just such spots as I found in Iceland (*ante*, 1901, p. 409), and which are also to be found in any volcanic area in the far north. Here, by throwing themselves into that upright attitude which I saw the Greylags (*Anser cinereus*) do, they would make themselves look, even from a short distance, exactly like weather-beaten lumps of black lava. The white front to the head is of the highest value to the bird for protective purposes, as it shines conspicuously, but is comparatively such a small speck, and terminates so abruptly by reason of its black border, and then is so softened down by the red bill that you cannot associate it at first sight with a living creature; and so it completely distracts attention from the sombrely clad body of the bird! Thus we see that what appears to us—if we examine a cabinet specimen or an illustration—to be a glaringly conspicuous mark for betraying the bird, is utilised by nature as a potent factor for the bird's protection at the most important period of its life!

Adult female.—Length and weight not kept; wing $15\frac{3}{4}$ in.; bill 2.12 in.; tarsus 2.65 in.

I have given the descriptions of the two species alternately, so that the various plumages may be more readily compared.

Any ornithologist looking at the series of *A. gambeli* when they are placed side by side in a row, with their breasts all forward, could never doubt that they all belonged to one and the same species, judging by plumage alone. Upon scrutinising the series of *A. albifrons* under similar conditions, it is also equally clear that they belong to one and the same species, and that those species are distinct and easily separable. Turn all the birds round and examine the outlines of the bills, and the difference will be seen to be very striking. When one's eyes become thoroughly accustomed to these outlines, it is perfectly easy to separate the species by bills alone.

I now come to a very important point. I have said that I have discovered a further valuable osteological distinction: it is that the neck in *A. gambeli* is about $1\frac{1}{2}$ in. longer than in *A. albifrons*.

Up to January last I had secured all my specimens singly, and had not noticed the difference in the length of neck; but in that month I was fortunate enough to get two specimens at one time—an immature *gambeli* and adult *albifrons*, and when the two birds were lying before me I was instantly struck by the extraordinary difference in the lengths of their necks. After skinning the birds and dislocating the necks at the base of the skull, the measurements were:—Adult *albifrons* $7\frac{1}{2}$ in., and immature *gambeli* 9 in. I should not have attached too much importance to this single instance, but I was enabled during February to abundantly corroborate this evidence by getting two adult *gambeli* which gave me necks of $8\frac{3}{4}$ in.* and 9 in.; also another adult *albifrons* with a neck $7\frac{1}{2}$ in.

I think, in the foregoing remarks, I have given abundance of proof in differences of plumage and osteological characters already well known to fully establish the distinctions between the two birds; but the final discovery ought surely to be all that is required to prove the specific validity of *Anser gambeli*.

It will perhaps be useful to give here, in tabular form for easy comparison, the measurements and weights of the various specimens:—

* Injured by shot.

A. gambeli.

Stages.	Length.	Weight.	Wing.	Bill.	Tarsus.	Neck.
	IN.		IN.	IN.	IN.	IN.
1	29½	5 lb.	15¾	1·98	2·75	—
2	—	—	15½	2·13	2·65	—
3	28½	5½ lb.	16	2·13	2·93	—
4	28½	5¼ lb.	16½	2·1	2·95	8¾
5	—	—	—	—	—	—
6	28	5 lb. 2 oz.	16½	2·17	2·91	9
7	29	5 lb.	18	2·24	3·0	—
8	27½	4¾ lb. (thin)	16½	2·1	2·75	9
9	—	—	17½	2·1	2·85	—
10	26	5 lb. 2 oz.	15½	1·95	2·62	—
11	—	—	15¾	2·12	2·65	—

A. albifrons.

Length.	Weight.	Wing.	Bill.	Tarsus.	Neck.
IN.		IN.	IN.	IN.	IN.
—	—	15	1·85	2·45	—
—	—	—	—	—	—
—	—	—	—	—	—
26	4½ lb.	15	1·80	2·52	7½
—	—	—	—	—	—
27½	5½ lb.	16½	1·85	2·60	7½
27½	5½ lb.	16	1·80	2·60	—
27	5½ lb.	16½	1·80	2·65	—
—	—	—	—	—	—
—	—	—	—	—	—
—	—	—	—	—	—

It will be seen from this that *A. gambeli*, taken all round, is a larger bird, with a proportionately much longer neck, than *A. albifrons*. Add to this a yellowish umber eyelid against dark drab, and reddish orange legs and bill against orange yellow legs and pale livid yellow bill.

I will here again refer to Mr. J. H. Gurney's paper above cited, and say how thoroughly I agree with him in his contention that all three White-fronted Geese should be treated as distinct species. I have already said sufficient with regard to the two larger ones; but now place my *A. erythropus* amongst the whole of the specimens, and it stands out instantly and conspicuously as distinct from all.

Mr. Gurney refers to *A. erythropus* having been described as being no larger than an Eider Duck, or even a Mallard. This is quite right so far as length and weight goes, for I have had Eider Ducks $5\frac{3}{4}$ lb. weight and length 28 in., measured to the toes, and Mallards 4 lb. with length exceeding 22 in., but the comparison goes no farther than this. This Eider of $5\frac{3}{4}$ lb. and 28 in. long exceeds the length and weight of the largest specimen of *A. gambeli*, but it does not look as large as *A. erythropus* of $4\frac{1}{2}$ lb. The fact appears to be overlooked that the feathers clothing the body of an adult Wild Goose are *very much larger* than those on the body of an Eider Duck, which makes the former look conspicuously larger than the latter. Those writers who describe the lesser White-fronted Goose as being about the size of a Brent Goose make a far more commonsense comparison. My specimen of *A. erythropus*, which weighed $4\frac{1}{2}$ lb., was a very plump, indeed quite fat, bird; in the normal condition of flesh in the breeding season I can quite understand that it would

weigh 4 lb., or even under, which was the weight of Mr. Popham's bird shot on the Yenesei. Mr. Chapman's bird at $2\frac{1}{2}$ lb. was obviously in very poor condition.

Finally, it only remains now to discuss the probability of *Anser gambeli* crossing the Atlantic to the west coast of Ireland, or coming by some other route. I will at once and most emphatically express my opinion that there is nothing in the faintest degree unreasonable in suggesting that they can and do accomplish this journey easily and regularly. But we all know that these birds breed in the high north, and my own investigations in Iceland proved to me that White-fronted Geese only rest regularly there during the migratory period; which species I cannot say, but as likely to be *gambeli* as *albifrons*. Instead of the across Atlantic journey, it is more reasonable to assume that these birds come across Greenland—even if they do not breed there—to Iceland, and could then easily continue their journey downward, fringing the narrowest part of the Atlantic to Ireland. If Greenland and Iceland Falcons and so many other northern birds do it regularly, why not the powerful flying Wild Geese? If the Snow Goose (*Chen hyperboreus*) comes, why not *A. gambeli*? For my own part I should not doubt that they could easily cross even the broad part of the Atlantic.

The scepticism which has for so many years been indulged in with regard to American migrants visiting Great Britain must surely be utterly swept away now by the fact of so many American birds visiting our islands. The fanciful assisted passage theory is utterly inadequate to explain it, although it is perfectly certain that some birds do rest on vessels at sea, and travel with those vessels for a time, as instances have come under my own notice. But these occurrences are in no way sufficiently frequent to account for the great and increasing numbers of American birds which are coming to us—especially amongst the Waders. Even Yellow-billed Cuckoos and Carolina Crakes are just as genuine migrants as Snipe-billed Sandpipers, American Bitterns, Spotted Sandpipers, or American White-fronted Wild Geese.

There is one fact which all must admit, which is that of late years some birds are changing their lines of migration; further, that, in many instances, those birds breeding in the far north do

not all take one line of migration for their winter quarters, but some go east, others come west. Take for instance the case of the Snow and Lapland Buntings; great flocks of both these species make for the American Continent, whilst other flocks come to us. What one species of bird will do, others will also; and is there anything unreasonable in suggesting that some flocks of *A. gambeli* make for the American Continent, while others come to our shores? It will, I think, be but reasonable to look for more American bird visitors in the future.

When we can obtain the services of some competent field naturalist who thoroughly understands the differences in the notes of birds, and who will have an opportunity of studying both *A. albifrons* and *A. gambeli* at their breeding haunts, we shall probably find that the habits and the notes of the two species are distinct. I quite understand the difficulties of studying the breeding habits of these birds, in consequence of the high northern districts selected by them for nidification being almost inaccessible to most naturalists, but I will urge that anyone whose good fortune it may be to pass a season in these regions can render a great service to ornithology by paying particular attention to this subject.

Before concluding this paper, I ought perhaps to say a few words of explanation upon two subjects I have touched upon during the progress of my arguments, viz. the power possessed by birds of *extracting from* and *transmitting to* their feathers colouring matter. The latter—colour change independent of a moult—has been dealt with by several writers latterly, but, in my judgment, not thoroughly. It will be seen that my views are very strong on the point—they have been so for a good many years past—and I have accumulated a mass of evidence which appears to me to place the matter beyond doubt; nevertheless, an intelligent study of the case of the White-fronted Geese alone ought to be sufficient to satisfy even our American friends. The former case—extracting the colouring matter from the feathers—is, I think, new. This point also I have not broached without due consideration, and during many years' study have amassed evidence of a most conclusive character. I formulated my views in a paper as far back as 1896, but for certain reasons did not allow it to be published at the time, and have since been too much occupied with other matters to revert to it.

NOTES AND QUERIES.

AVES.

Birds in the Valley of the Namsen. — The Namdaleners—and, indeed, all Norwegians—take great care of their birds, except those that are inimical to their interests; so that one derives immense pleasure in roaming through the fir-woods and alder-bushes by the river side. The birds are so tame—Magpies and Hooded Crows especially—that one experiences quite a new joy in being able to observe their characters and habits so near at hand. Then again we experience once more the youthful thrill of delight on finding such nests as those of the Fieldfare and Redwing, winter visitants whose breeding haunts and habits have always hung dimly in the regions of mystery. The above-mentioned Crows abounded; I counted sixty Hoodies crossing the river together as they flapped away to roost; and, indeed, became an unmitigated nuisance in the early morning, when they held high parliament outside my bedroom window. Hazel-grouse (*yerpe*) flushed in desultory coveys like Partridges from the alders and fir trees; and once, while speeding through the lovely fern-clad, moss-carpeted pine woods to the daily Salmon fishing, I hopped into the very midst of a splendid covey of Capercaillie, quite tame, within ten yards, and they simply whirred heavily away into the nearest fir trees, not in the least alarmed. The monotony of broad still river was relieved by many pairs of Mergansers passing up and down, or in the evening shooting out across the stream, with their trip of downy-lings, to the shallows on the opposite shore, where they will eat Salmon-parr to their hearts' content. Black-throated Divers, too, were there in plenty, very busy fishing, and mewling over their ill-fortune, or flying away with weird croakings to their romantic breeding haunts far away in the hills. It seems a pity that government grants are offered for all these birds, though I am bound to confess that I took six Salmon-parr, two inches long, from the throat of one little “‘Ganzer.” Fortunately, however, the one croner offered, in the case of the Divers, takes a deal of earning. It cost me ten, and I failed to secure the government grant after all. A price is set, too, upon all birds of prey, the unhappy Buzzards, which do no harm to the farmers

and an incalculable amount of good, suffering the most, since they are easiest to secure. One pair were accused of killing Capercaillie and Ptarmigan, and their death-warrant signed ; so I went off to the hills to secure pictures of the nest and specimens of the birds. The nest was full of débris of Mice—Bank-Voles chiefly ; one lay uneaten on the sticks. But, though I rigged up a chicken in a most tantalizing manner to try and secure the male bird, neither the cock nor hen, who kept howling from the top of a fir tree, would look at it. The farmer became less convinced as to their destructive propensities, but still eight croners for the four birds form a strong inducement to them to send in the claws to the local *landsman* (policeman).

Of other birds, one noted the Brambling, Norfolk Plover, Greenshank, Common Sandpiper, Curlew, Grey Plover, Spotted Flycatcher, Heron, Marsh Tit, Swallow, House and Sand Martin, Redstart, Whinchat, Willow-Wren, and many others ; while the note of the Great Black Woodpecker was frequent in the hill-forests, though I never had the luck to see one. The Cuckoo, too, was in full song in July. One could have wished that the pursuit of ornithology had been one's only pastime ; but, since we had travelled for a whole week to catch Salmon, our backs had to be turned resolutely on the woodland glades.—
FREDK. PICKARD CAMBRIDGE (Wimbledon).

The Two-barred Crossbill in Nottinghamshire.—I was delighted to be able to add a new bird to the Nottinghamshire list, *viz.* the Two-barred Crossbill (*Loxia bifasciata*). When in Southwell (the smallest city in England, and which contains one of the most beautiful cathedrals), I called on Henry Schumach, the talented taxidermist. I found him going over an old box of birds preserved by his late father, and amongst them at once "spotted" this rare British visitor. I asked him about it, and he said : "I remember it being shot very well by Mr. Emery, butler to the late Mr. Wyld, of Southwell. He saw it in some big old Scotch firs in the grounds, and shot it, and brought it to my father, to whom he gave it." I then asked him why his father had never mentioned it to me or others. He said he thought it must have been an escaped cage-bird, so stuffed it to put in a case some time, but had never done so. He was at home when the bird was shot, and saw it in flesh when brought in. I had a good look at it ; the claws were sharp, and plumage good ; legs a bit shattered by shot. I have secured it for my collection, and shall value it as a rare British bird.—J. WHITAKER (Rainworth, Notts).

Cirl Bunting in Ireland.—On Saturday, August 2nd, within half a mile of Dunfanaghy, Co. Donegal, I watched for some time an adult
Zool. 4th ser. vol. IV., September, 1902.

specimen of the Cirl Bunting (*Emberiza cirlus*). The bird was on some gorse by the side of the road, and allowed me to remain about ten yards away, sufficiently long to point out to my wife—who was with me at the time—the difference between it and *citrinella*. I may add that the Cirl Bunting is a bird with which I am very well acquainted, and in this case was first attracted by its note. This appears to be the first record for Ireland.—H. E. HOWARD (Clareland, near Stourport, Worcestershire).

Cirl Bunting in Carnarvonshire and Cardiganshire.—In reference to the occurrence of the Cirl Bunting (*Emberiza cirlus*) in Carnarvonshire, recorded by Mr. Aplin (Zool. 1899, p. 322), it may interest him and others to know that this bird is by no means uncommon in that part of the county near the Little Orme. During a short stay in the neighbourhood in July, I heard and saw five males within a radius of one mile. One afternoon two birds were singing together in a church-yard, within a few yards of each other; one was perched on the east gable of the church, the other in a yew tree. Close at hand I also found a nest, which by July 16th contained three eggs. This nest, chiefly composed of hay, grass, &c., was built in a hedge bordering a lane, amongst blackthorn, brambles, &c., and, as is usually the case—so far as my experience goes—placed on the field side of the hedge, and invisible from the lane. Another nest, out of which the young had just flown, was built in an isolated bit of gorse in a hedgerow, also bordering a lane. Curiously enough, immediately under this nest, but in the bank and next the lane, there was a Yellowhammer's nest with four eggs, showing that the two species do agree together at times. With regard to the song of the Cirl Bunting, it may not be generally known that the same bird will sometimes alter its usual loud trill to a much sharper and higher key. Its call is somewhat remarkable and unmistakable, being a very thin sibilant note repeated at intervals. There is another alarm-note, uttered occasionally by the male, which is identical with that of the Hedge-Sparrow; this note I heard when handling the young, with the old bird within a few yards of me. Again quoting Mr. Aplin: in his interesting and valuable paper on the distribution of this species, he mentions Aberystwith as the only locality in Cardiganshire where it has been observed. I may here say that on July 18th, 1901, I heard several singing at and near New Quay in Cardiganshire.—S. G. CUMMINGS (King's Buildings, Chester).

Notes on the Cuckoo in Aberdeen.—The season here has been very bad for *Cuculus canorus*. It was first heard on May 4th, but only a

solitary bird up to the 9th. I have a record of hearing the note of these birds up to about June 28th, and they were seen up to August 7th. I saw a solitary bird as late as August 25th ; it was a slate-coloured example, and seemed to be an adult from its appearance. I observed the first young one on June 5th. There were a few young about, exhibiting the usual variety in the colour of the plumage. In fact, there might be as many young as usual, but certainly no permanent increase in numbers as was observed in former seasons. A favourable season next year might lead them on a little further, for the adults were not numerous, and, owing to the cold weather, many may have remained in a milder climate than here. The Twite (*Linota flavirostris*) was still the only foster-parent ; while I failed to get any further particulars as regards the movements in connection with the young of the foster-parents.—W. WILSON (Alford, Aberdeen, N.B.).

Sooty Tern in Lancashire.—I have recently had an opportunity of examining a Sooty Tern (*Sterna fuliginosa*) in adult plumage, which is said to have been found alive in Hulme, one of the most densely populated districts in Manchester, on the 9th of October, 1901. The bird is in the possession of a man named Nuttall, who told me that when passing along Denbigh Street soon after dawn, in pursuit of his calling as a “knocker-up,” his attention was attracted by a black and white bird, which was lying on its back, and struggling feebly. Nuttall, who takes some interest in birds, has at different times picked up dead or exhausted migrants in the streets in the early hours, and has a small collection of birds which he has shot on the outskirts of the city. In the dim light he mistook the Tern for a Lapwing which had come to grief among the telegraph-wires, but a closer examination showed it to be “some sort of Sea-Swallow” with which he was unacquainted. The bird died in his hand, and the local taxidermist to whom he took it was unable to name it for him. When skinned it showed no sign of injury, but proved to be in very poor condition, and had apparently died from exhaustion after buffeting with the boisterous weather which had culminated in a gale from the south on the night before it was found. After it had been set up it was exhibited at a meeting of the British Ornithologists’ Club on Nov. 20th, by Mr. Howard Saunders. It is a matter for regret that the Tern was not submitted in the flesh to some competent authority, but its history as related to me by Nuttall and the man who stuffed it appears to be quite satisfactory.—CHAS. OLDHAM (Knutsford).

Erratum in last Issue.—Note on “Breeding of the Bittern in Herts” (*ante*, p. 316). For “John Wobley” read “John Wolley.”—FRANCIS C. R. JOURDAIN (Clifton Vicarage, Ashburne, Derbyshire).

REPTILIA.

The Habits of the Grass-Snake (*Tropidonotus natrix*) in Confinement.—This species, besides being very easily procured, is very hardy, and not nearly so subject to canker in captivity as are some of the continental species. Out of about twenty-five specimens I have had in my possession, only one has died of this disease, and that one through being put into an infected cage.

The Grass-Snake, or Ringed Snake, when frequently handled, soon becomes tame, and hardly ever attempts to bite. There are certainly two or three instances recorded where it has done so; and I myself was once bitten by one, but it is certainly of very rare occurrence. The food of this snake undoubtedly consists of frogs and small fish, and very rarely toads, and some of my snakes will frequently take minnows out of my fingers, while I have often induced them to take a dead minnow by moving it about in their front. The Grass-Snake is said to eat the eggs of birds, but, although this may be the case, I have never been able to induce my snakes to eat them in captivity. The Grass-Snake will frequently breed in captivity, and in some cases incubate her eggs. One specimen I had two years ago laid sixteen eggs shortly after she came into my possession, but subsequent to their deposition she took no more notice of them. These eggs were all separated from one another, and this, I think, is rather unusual, as they are generally joined together in a string by a glutinous substance.

The Grass-Snake is very fond of water, and is an excellent swimmer. It should therefore, while in captivity, be provided with a large pan of water, in which it will frequently remain for a considerable time completely submerged, with the exception of the head; one of my specimens whilst casting its skin this summer remained in the water for more than ninety-six hours.

As regards the sloughing of this species, I have noticed that it is much less frequently done than in other European species. Many of the latter—such as the Dice, *Aesculapian*, and Leopard snakes, which I have kept—have cast two or three times between the months of April and September; whereas many of the Grass-Snakes have not cast at all during this period, not even after passing the winter in confinement in a state of semi-hibernation.—B. J. HORTON (305, Stratford Road, Sparkbrook, Birmingham).

NOTICES OF NEW BOOKS.

Atlante Ornithologico. Uccelli Europei, con Notizie d'Indole Generale e Particolare. Del Dr. E. ARRIGONI DEGLI ODDI. Milano : Ulrico Hoepli.

THIS massive and beautiful volume is an addition to the series known as 'Atlanti Diversi per la Gioventù Studiosa,' editi da Ulrico Hoepli. It is written by an ornithologist who is not a stranger to these pages, and, published in a moderately cheap form, with a wealth of illustration, supplies a good handbook for the study of continental ornithology. The first section to p. 165 constitutes a general introduction to the subject, and refers to general structure, mimicry, dimorphism, hybridity, geographical distribution, migration, and classification, among other subjects; while an exhaustive bibliography is also appended. Five hundred and sixty-five species are descriptively enumerated, fifty coloured plates are given, and many blocks illustrate the text. The three concluding plates are devoted to eggs ; the other plates each contains a number of birds, arranged in a somewhat ancient style, and not quite approaching the record form in either chromo-lithography or coloured photography of to-day, but still of a useful nature for recognition : iconographic more than absolutely artistic.

The author, however, has brought his letterpress thoroughly up to date. A knowledge of the Italian language, so far as descriptive phraseology is concerned, is not a difficult acquisition, even for those to whom Dante and Tasso in the original are sealed prophets. We English, as a rule, are perhaps the worst linguists in the world, and are meek before our own hairdressers and restaurant waiters, who are probably, in a colloquial sense, the best. We may find some solace in the reflection that the men who really know their own language are incomparably fewer than those who have a facile smattering of other tongues, and that to all inheritors of Babel the key to scientific diction is not a too difficult quest. There is sometimes a Sir R. Burton—but

seldom. We write thus because the author of this book is really worth reading, and the difficulty of doing so to the most parochial Anglican is not insurmountable.

The lettering to the plates consists of Italian or local terminology. This really affords a useful lesson. Some authors are so inclined—even in these pages—to give British names only for British birds, that they may by perusal of these cognomens attain some conception of how local names appear to both English and Italian readers. We certainly should not have recognised our old friend the Bullfinch under the name of "Ciuffolotto," and the need is accentuated of birds when referred to in print being called by their universal or scientific cognomens, as the author has done in his text.

This is a book worthy of a shelf on the line in every naturalist's library, inciting frequent reference, but also demanding a much stronger binding than the one in which it is issued.

Descriptive Catalogue of the Coleoptera of South Africa. By
L. PÉRINGUEY, Assistant Director, South African Museum.
Trans. South African Philosophical Society, vol. xii.

THE publications of museums show by their subject-matters the varying specialities pursued by the official personnel. Formerly the South African Museum, when under the charge of Mr. Trimen, was the seat of lepidopteral publication; while the advent of Mr. W. L. Sclater produced volumes on mammalogy and ornithology. Now Mr. Péringuey has commenced a colossal work for one man to achieve, and is publishing nothing less than a descriptive catalogue of the South African Coleoptera, the last instalment of which occupies no fewer than eight hundred and ninety-six pages of vol. xii. of the Transactions of the South African Philosophical Society. This is not only an energetic but a courageous work for Mr. Péringuey to undertake away from European collections and libraries, and we trust he may be spared to complete his gigantic enterprise. A bare catalogue of South African Coleoptera alone is a desideratum, but a descriptive enumeration will place entomologists under an obligation, and they will welcome a work to whose virtues they will be wondrous kind, while to some unavoidable limitations they must critically be a little blind.

EDITORIAL GLEANINGS.

WE have extracted the two following paragraphs from the ' Pharmaceutical Journal ' of August 16th :—

Spider Poison.—R. Kobert has investigated the debated question as to whether indigenous German spiders are poisonous to higher animals and men. He finds that the introduced species (*Chiracanthium nutrix*), particularly the female, which bites when disturbed, is toxic. A case occurred in which the bite of one of these spiders was followed by a rigor, and the wound subsequently suppurated. The native *Epeira diadema* is also poisonous. Of the juice of the whole spider, one milligramme injected into a cat occasioned death. Probably the fluid secreted by the poison glands alone would be much more toxic. The poison appears to be a soluble albuminoid. Sachs has extracted the poison by macerating the *Epeiras* in toluol water containing 10 per cent. of salt. By this means he has isolated very active hæmolysin, which disintegrates the blood corpuscles of man and animals at ordinary temperatures. It appears to be a toxin.—*Pharm. Centralh.*

Toad Poison.—C. Phisalix and G. Bertrand have succeeded in isolating two toxic principles from the parotid gland and skin of the Common Toad (*Bufo vulgaris*). Of these bufotaline, $C_{119} H_{171} O_{25}$, occurs as a transparent resin, very soluble in alcohol, chloroform, and acetone; less soluble in ether, and almost insoluble in petroleum ether or in carbon disulphide. It is precipitated from alcoholic solution on the addition of water, forming an emulsion, which is redissolved on further adding a large volume of water. Although very dilute, the solution thus obtained is extremely toxic to Frogs. It acts on the heart, and does not affect the nervous system. Applied to the tongue, it has a bitter taste, and gives rise to a peculiar and very persistent sensation. It is obtained by squeezing the parotid glands of the animals under water.—*Comptes rend.*

THE investigation into the connection between Mosquitoes and fever, especially in West Africa, is still being pursued with activity. Lieut.-Colonel A. H. Morris, D.S.O., now in charge of the Northern Territories of the Gold Coast, has made a report to the Colonial Office on the subject, of which the following is an extract :—

" Now that so much attention is being paid to Dr. Ross's anti-Mosquito campaign in West Africa, it may be perhaps of interest to mention our efforts in this direction in Gambaga.

" Following out the instructions for the prevention of malarial fever published by the Liverpool School of Tropical Medicine, I caused all holes that might contain puddles, and so become breeding grounds

for the *Anopheles Mosquito*, to be filled up. Some hollows in rocks were discovered containing about 18 in. of water filled with thousands of larvæ.

"The Hausas' and Carriers' lines were inspected twice a week, in order to ensure no stagnant water being allowed to remain in old pots or tins. The general result has been an immense reduction in the number of Mosquitoes. With regard to my own quarters, in addition to taking these sanitary measures, I had every Mosquito killed so far as possible as soon as it appeared. The result of this was that my own house was nearly free from Mosquitoes, and I have only had half a day's fever during my time in Gambaga (nearly ten months). Whether this immunity has been due to the absence of the Mosquito, I do not venture to say."

From East Africa the same excellent testimony arrives. Reports by various administrative officers are appended by Mr. Sharpe in his report on the British Central African Protectorate. That of the chief medical officer describes malaria amongst the Europeans as decreasing on account of their care to protect themselves against Mosquito "bites."

THE Sea-serpent has again been sighted, this time on the Australian coast, by the captain of the steamer 'Chillagoe,' belonging to the Howard Smith Line (Melbourne). The 'Chillagoe' arrived at Sydney (N.S.W.), on July 13th, from Port Pirie (South Australia) direct, and Capt. W. Firth supplied the following particulars :—"On the passage from Port Pirie to Sydney, when off Ram Head, a monster serpent was seen by several members of the crew. Desiring to get a good view of this monster, the ship's course was altered. Closer inspection proved it to be an immense serpent of, as far as could be judged, from 30 ft. to 35 ft., with four dorsal fins about 6 ft. apart, standing about 4 ft. or 5 ft. high. The head resembled that of a Seal, only it was much larger, being about 2 ft. in diameter. When the ship approached to within 100 yards of the monster, it raised its head, looked at the vessel, and disappeared. It was seen by myself, the second officer, and several others. All agree that it resembled the serpent seen by those on board the 'Princess,' illustrated in the 'Strand Magazine,' the only visible difference being the fins, which seemed more angular than those in the 'Magazine.' The body of the serpent did not appear above the water, but it must have been of immense size."

[The above has appeared in the daily papers, and is here inserted without comment. It is necessary that these narratives should be collected.—ED.]

CORRECTION.—*Ante*, p. 319, twelfth line from bottom of page, for "exclusively" read "extensively."

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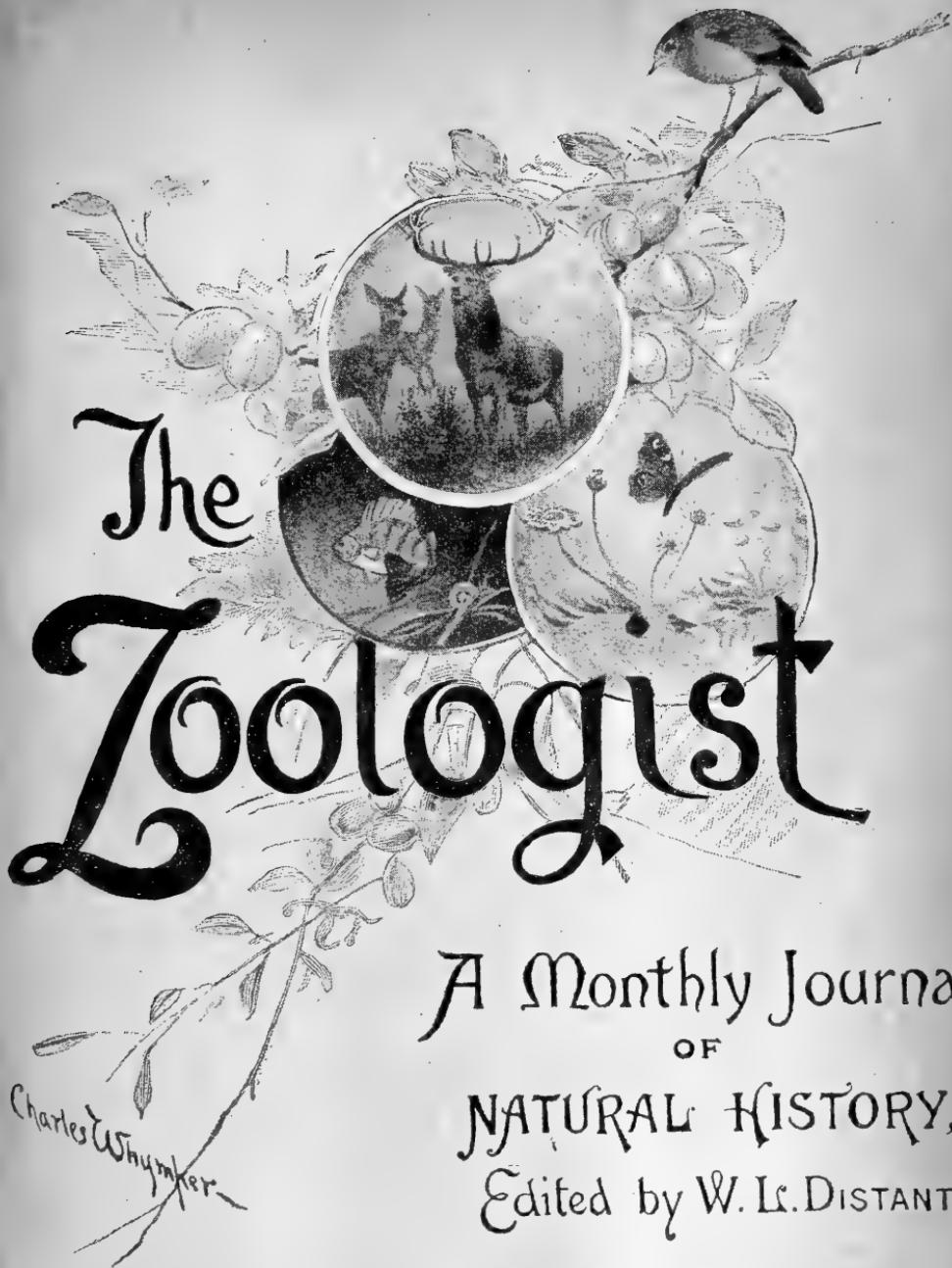
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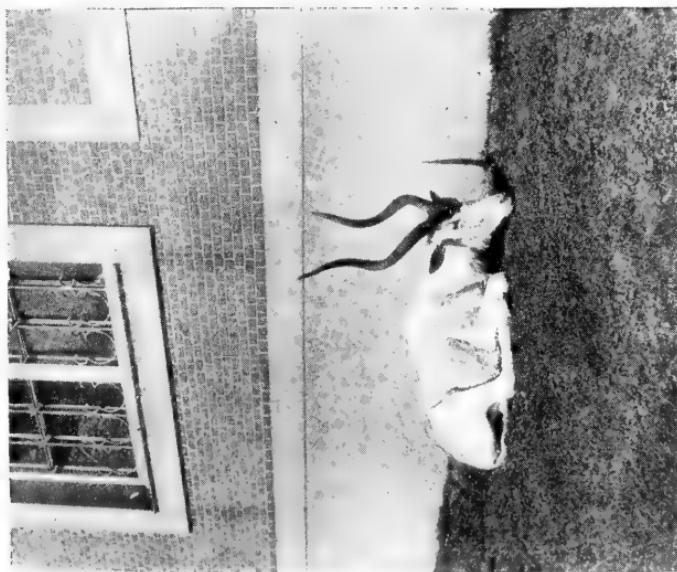
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AUGUST.



MAY.

Seasonal Changes of *Addax nasomaculatus*.

THE ZOOLOGIST

No. 736.—*October, 1902.*

NOTES FROM SOME ZOOLOGICAL GARDENS OF
WESTERN EUROPE.

By GRAHAM RENSHAW, M.B.

PLATE II.

THE nineteenth century may be regretfully considered, from a zoological standpoint, as an era of extermination, a host of fine species having been recklessly blotted out by man since the year 1800. To instance only a few of these vanished forms, one may mention the Black Emu, the Reunion Starling, the Philip Island Parrot, the Labrador Duck, and the Great Auk. The disappearance of these species alone is a great loss to zoology; yet one might easily multiply examples indicating only too plainly the inexcusable havoc which has been caused amongst the lower animals during the last hundred years.

Brighter prospects, however, seem to be dawning with the twentieth century. The more active measures taken to enforce the due protection of the African great game animals during the last decade appear already to have achieved considerable success; whilst in other parts of the world the efforts of enlightened Governments have been able to arrest the diminution of threatened species, if one may rely upon the latest information concerning the European Bison, the American Bison, and the Scandinavian Elk. Moreover, the gun appears to be gradually being abandoned in favour of field-glass and camera, the observation of animals in their own haunts being now more

popular than ever; whilst the recent publication of various excellent works illustrated with photographs of living creatures under natural conditions will tend greatly to increase the number of those who take greater pleasure in watching the habits of living mammal and bird, reptile and fish, than in examining mere museum specimens of the same animals.

The various splendid zoological gardens of Europe have for many years contained a considerable amount of material for study; yet such material seems after all to have hardly received the attention that it has deserved. These institutions should not be regarded merely as resorts for crowds of curious sight-seers, but rather as extensive and very valuable biological laboratories where the fascinating science of zoology may be studied by means of note-book and camera rather than by the academic aid of microscope and scalpel. If fed on suitable food, and allotted abundant room for exercise, captive animals will afford much instruction to any naturalist who will study them systematically; and, although results may be somewhat vitiated by the absence of the proper surroundings of the species under observation, at any rate this method is extremely convenient for the naturalist himself, especially if he have no leisure for foreign travel. It is hoped that the following notes I have made on various inmates of continental menageries during the last four years will not only be interesting, but also contain much that is new. The animals now to be considered are as follows:—

CARNIVORA.

Canis jubatus (Maned Wolf).—An example of this very rare beast has been living for several years in the Amsterdam Zoological Gardens, its long ears and spidery legs constituting it one of the most striking exhibits in the menagerie. In walking the Maned Wolf carries its head almost on a level with its shoulders, and much lower than would have been supposed from an examination of museum specimens, which are probably mounted by taxidermists unfamiliar with the appearance of the living animal. The gait of the Maned Wolf is not at all clumsy, but quite the reverse, in spite of the long legs, the animal stalking about its cage like a shadow, and moving with considerable gracefulness; on account, however, of the great

elongation of the fore leg below the knee the front part of the animal seems to be supported on stilts. When standing still the Maned Wolf draws its head well up, and then presents a very striking appearance.

UNGULATA.

Taurotragus oryx (Eland).—Ever since Lord Derby obtained his specimens of this fine Antelope for the Knowsley menagerie in 1842, Eland have been more or less familiar even to untravelled people, and most zoological gardens have from time to time possessed a pair or more of them. The Striped or Livingstone's Eland is still to be obtained, but the rapidly increasing rarity of the old unstriped form of the Cape lends a melancholy interest to the contemplation of the few examples now in captivity. I remember spending some time, in the late summer of 1900, in studying the herd of Unstriped Eland then still surviving at the Jardin d'Acclimatation in Paris. It was not encouraging as regards the perpetuation of the race to observe that in the herd of five there were three animals whose bent or otherwise malformed horns indicated but too surely the need for the fresh blood so difficult to obtain. Unstriped Eland tend to darken with age, and bulls may become quite black along the spine. Young bulls sometimes grow horns having an antero-posterior curvature, plainly evident when seen from the side, the concavity of the curve being anterior. One young adult I saw recently in a continental collection had the horns somewhat unequal, and curiously bent outwards at the tips, as if indicating an approach to the open spiral horns of the Kudu, or the still more open spiral of the Addax.

Wild Eland are stated to smear their foreheads with their own urine. I recollect observing a fine bull of this species busily rubbing his frontal mat of hair upon a moist place in the paddock where he was confined, and energetically raking up the mud with his horns. Scarcely had he desisted than his offspring—a youngster only a few weeks old—came up, and imitated his example. Perhaps both were instinctively following some transmitted ancestral impulse, but, as both had been born in Europe, the reason for the act was not very obvious.

Addax nasomaculatus (Addax). (Plate II.)—This interesting

Antelope is thickly clothed in winter on neck, shoulders, and the body as far as the hind quarters with a dense covering of coarse dun-coloured hair, which falls out in summer, leaving the animal smooth-coated. Specimens in zoological gardens have this change of coat well marked in the month of May. As far as I have been able to observe, the hair falls out in irregular patches, commencing on each side of the spine, and spreading downwards from several centres, the greyish hue of the subjacent coat gradually appearing through the thinning *pélisse*. The heavy tuft of dark-brown hair covering the forehead is unaltered at all seasons, and traces of coarse hair likewise persist on the throat, chest, and sides. One of these Antelopes, in August, 1900, was of a general greyish white colour ; frontal tuft brown, and vertex of head behind horns lighter brown ; the throat-mane was also brown, and very scanty. Thus the coat of the animal in summer differs very markedly from its winter covering.

Hippotragus equinus (Roan Antelope).—Occasionally one has the opportunity of observing, as regards menagerie specimens, various occurrences which are frequently recorded of the animal in a wild state. Thus sportsmen have frequently pointed out that even large Antelopes like the Roan may, in spite of their size, be quite unrecognisable when standing in dense bush ; and it has been most interesting to observe some confirmation of this as regards the Senegambian Roan Antelope, the most conspicuously marked of all the protean variations of *H. equinus*. One would reasonably suppose that an Antelope as large as a Horse, with black and white face, black legs, and chestnut body, would be seen easily enough under almost any conditions ; yet a fine cow of this species at Antwerp, when standing in her paddock under some overhanging trees, was admirably concealed by her very coloration. The black of the face and legs harmonised completely with the shadows cast by the branches overhead, whilst the bright sunlight streaming through the interstices of the foliage merely revealed the chestnut-coloured body as a large surface of uniform colouring. Had this Antelope been standing amidst natural surroundings she would surely have escaped observation altogether.

Connochaetes taurinus (Brindled Gnu).—It may not be generally known that these extraordinary looking Antelopes—half

Buffalo, half Pony, as it were—often bear vestiges of their Hartebeest ancestry in the shape of more or less distinct annulations on the horns near the base, and most distinct on the posterior aspect. In a pair I recently examined the cow had five distinct rings on each horn, and very similar markings were recognisable on the bull. One character of these animals appears to have been hitherto overlooked in descriptions of their external appearance—the mane hangs over to the *right* side of the neck, whereas in several other Antelopes, such as the Beisa (*Oryx beisa*), this appendage inclines to the left. Brindled Gnu are fond of rubbing themselves against posts, and also delight in rolling in any moisture that may be found in their paddock. They are extremely inquisitive, and will frequently come up to investigate an object with determined and not very friendly curiosity. If two are kept together they will fight in a more or less determined manner, dropping on their knees to crash their heavily armed heads together. Females with young are very alert and suspicious; one Gnu, which I had permission to photograph, becoming somewhat alarmed at my proceedings (though at a distance of fully one hundred yards), gave the alarm by a peculiar braying snort. Immediately on hearing this the calf got up, and stood staring hard in the direction of the supposed danger.

Bubalis buselaphus (Bubaline Hartebeest).—The Bubaline Hartebeest does well in captivity, and under suitable conditions will breed as readily as Eland or Burchell Zebra. In 1900 there was quite a large herd at the Jardin des Plantes, Paris, numbering eight individuals, of which at least three had been born in the menagerie. The young were fawn-coloured like the parents, and had small horns in the form of short backwardly directed divergent spikes. The colour of the Bubaline Hartebeest appears well adapted to protect it in its desert home. I found that the outlines of a menagerie specimen standing on a sanded floor and against the woodwork of its enclosure began to be indistinct at a distance of twenty-four yards.

Giraffa camelopardalis (Northern Giraffe).—The history of the Giraffes brought to London in 1836 is probably familiar to many; most readers of 'The Zoologist' will recollect that the four animals then imported became the founders of a long line

of English-bred animals, which only terminated on the death of the last of them in 1894. One of the first of this series is figured in Sir Cornwallis Harris's work on the game of South Africa, so that those of us who remember the last survivors of this large family will realise that the London Giraffes constituted a link between the present day and the reign of William IV., since Harris set out on the shooting tour which eventually furnished material for his book as long ago as 1836. It may not perhaps be generally known that the Northern Giraffe has repeatedly bred in the Antwerp Zoological Gardens, births having occurred in 1871, 1873, 1875, 1876, and 1878. The last survivor of this fine series is still living, and carries her twenty-three years with the elasticity of youth. The young pair of Giraffes recently sent to Antwerp from the Soudan are much darker in coat than this European-bred female. The third horn of the eighteen-month-old male is about one inch long; the horns of the young female bear well-developed tufts of drooping hair not seen in either of the other two animals.

Equus zebra (Mountain Zebra).—The voice of this animal is a curious whistling metallic neigh. Young foals of this species are much rougher in coat than their parents, and the stripes are brownish rather than black; a Mountain Zebra foal in the Jardin des Plantes collection, at about ten months old, was still quite rough in coat. The stripes on the neck, mane, and legs were black, and those on the body were nearly all brown. The mother was very suspicious of all visitors, and continually endeavoured to interpose herself between her young one and any spectators, although the foal was already nearly as big as herself.

E. burchelli (Burchell's Zebra). — Most naturalists will be aware that the original type of this animal as described by Burchell had the legs unstriped, or at most with but few markings. The practical extermination of this form, however, has unfortunately now been compassed, so that almost all the Zebras of this species now in zoological gardens have the legs regularly banded, often right down to the hoofs. Occasionally, however, one meets with the rarer form, of which I have examined a specimen. As was seen from the rough coat, this animal was quite young. A remarkable point was that the animal stated to be its mother had

the legs regularly striped. An equine hybrid (Asiatic Wild Ass, ♂ × Burchell Zebra, ♀) now living in the Jardin des Plantes is rufous grey in colour, having the body and legs ornamented with long thin stripes, but the hind quarters boldly marked with broad dark bands like its mother.

Cervus davidianus (Père David's Deer).—Much interest attaches to this very rare animal, since probably it is now utterly exterminated in the wild state, those now in captivity—a scanty band indeed—being all that is left of the species. I recollect seeing several in the Jardin d'Acclimatation some years ago, but they are all gone now. An old male still survives in the Jardin des Plantes—a faded-looking specimen, and not at all attractive, save for his great rarity. When I saw him a few weeks ago he was standing still, with muzzle on ground, sleepy and lethargic, as if the fate of his race was beginning to personally oppress him. The note of this Deer is a disagreeable bray; in fact, *Cervus davidianus* cannot be considered a nice animal at all.

RODENTIA.

Cynomys ludovicianus (Prairie Dog).—These little rodents flourish abundantly in captivity if allowed plenty of room, frisking about in broad daylight like so many Ground Squirrels, and continually popping in and out of their burrows. Such individuals as I have been able to observe delved with tremendous energy and enthusiastic perseverance, the earth being rapidly thrown out between the straddled-out hind legs. As far as one could judge, the shape of the mounds thus thrown up by these Prairie Dogs was flatter and somewhat more elongated than that of the typical watch-tower structure usually figured in works of natural history. The Prairie Dog "town" in the Jardin d'Acclimation consists of a number of somewhat widely separated burrows, and none of the mounds are very large; in fact, at a short distance they are hardly distinguishable from the surrounding earth. Prairie Dogs will breed readily in captivity, and make interesting pets.

VARIATIONS IN COLOURING OF *STERCORARIUS CREPIDATUS*.

By EDMUND SELOUS.

THE Arctic Skua (*Stercorarius crepidatus*) is usually described as being dimorphous—that is to say, of two forms in regard to its plumage, one dark and the other light. I have lately, whilst in the Shetlands, written down the description of various birds as they stood on the heath, after carefully watching them through the glasses, at a very moderate distance. I might have added greatly to the list, hardly any two individuals being alike in the same degree that the individuals of most other birds are—at least this appeared to me to be the case. But my time for this was limited, and my list consists of fifteen birds only. It is as follows:—

(1) The neck from just below the head, with the throat, breast, and ventral surface as far as the legs, a beautiful creamy white. The rest dark, as in the ordinary cases; but I was not careful to note the precise shade. The crown of the head—and this, I think, is universal—sufficiently dark to appear black. This bird represents, I think, the extreme of the light form in which dark and light are almost equally divided.

(2) The light colouring extends, speaking roughly, over the same parts, but it is very much less bright and pure. It might be described as a dun-cream or cream-dun, the two shades seeming to struggle for supremacy. The cream prevails on the neck, the dun on the other parts; but even the neck is of a much duller shade than in the bird just described (No. 1). There are parts of the breast where the original sombre hue, a little softened, encroaches cloudily upon the lighter surface. These two birds cannot—I say this after due comparison—be described as more or less handsome in the same colouring. The lighter surface, at any rate, is plainly different in shade, as also its amount and distribution, though in a less degree.

(3) Another bird is much like this last one (No. 2), but there is, here, a distinct broad dunnish space dividing the throat and breast parts.

(4) Another bird—one of two standing together—is the common form (that is, dark), except that the neck and throat just below the head for about an inch is very much lighter, making a considerable approach to cream, without quite obtaining it. This light part is conspicuous in the one bird, but not in the other (No. 5) it is standing by.

(5) This other one might pass for the ordinary dark form, but on examining it through the glasses a lighter, though less salient, collar is distinctly visible.

(6) In a third bird, not far off these two (Nos. 4 and 5), the whole colouring from immediately below the forehead and crown of the head, which seems always to be black (or very dark), is of a uniform brown-drab or brown-dun colour, there being not the slightest approach to a lighter collar, or any lightness elsewhere, except that which—as in all the birds—becomes visible on the quill-feathers of the wings in flight.

(7) In another bird the breast and ventral surface is of a delicate silvery cream or creamy silver, something like that of the Great Crested Grebe. On the sides of the neck and just below the chin it is the same—perhaps a little less silvered; but between these two spaces—and so between the chin and breast—a zone of faint brown or dun, somewhat broken and cloudy, pushes itself forward from the wings, thus breaking the continuity of the light surface by the strengthening of a tendency which is, perhaps, just traceable even in the lightest specimens. Besides this a similar clouded space is continued downwards from the back of the head, first in a diminishing quantity, and then again broadening out till it joins the upper body-colour. So that here only a little of the nape is white, hardly more than what may be described as the two sides of the neck. This is a very pretty and delicate combination.

(8) Close beside this last bird (No. 7) is a uniformly dark brown one; and

(9), not far on the other side of it, one which exhibits the same sort of general effect, in a dark smoky dun. This latter bird would generally pass as representing the dark form, and,

with fluctuations in either direction, dark or light, it does represent the common form. Nevertheless, it is both light and varied compared with the extreme or uniform dark brown form beside it (No. 8), which appears to me to be the least common one of all, less so than the extreme light one (No. 1) at the other end. (N.B.—When I say uniform, I do not mean to include the crown of the head or tips of the wings, which are always darker than the rest of the plumage.)

(10) A bird that from the dark crown of the head to the dark tips of the wings is, above and below, a uniform dark browny dun, yet some washes lighter than the uniform brown one (No. 8) that I have spoken of.

(11) A bird that from the dark crown to the dark wing-tips is, above and below, a uniform light fawnly dun.

(12) A bird that would be the extreme light form (No. 1) that I have first described, were it not that both on the throat and breast the cream is encroached upon by cloudy barrings of a soft greyey-brown, which extend also over the under surface of the wings. Moreover, a toning of the darker colour of the general upper surface encroaches a little upon the cream of the nape.

(13) A bird exhibiting the uniform dusky dunnish colour (a shade lighter, perhaps, on the under surface), but with a cream patch on each side of the neck just below the head. These patches are not, perhaps, of the brightest cream, but they are very conspicuous, whether the bird is seen standing or flying—in fact, the conspicuous feature.

(14) A bird that would be the extreme light form (No. 1), but for a distinct collar of soft brown dividing the cream of the neck and throat from that of the breast.

(15) A bird that is yellowish dun on the neck and throat, mottled brown on the breast, and a fine cream on the ventral surface.

Moreover, all these birds differed, to a greater or less extent, in those lighter markings of the quill-feathers, both on the upper and under surface, some being lighter and some darker, following in this respect the general colouring. This feature, however, is only apparent when the birds fly, and I found it too laborious to include.

So far as I can be sure—judging by the lance-like projecting

feathers of the tail, absent in the young bird, and by every other indication—all the individuals here described were old birds in mature plumage. They were all established in one locality, and I was able to compare most of them with each other. I think, therefore, that, though some of my colour-terms may not be quite accurate—in describing colours there is generally some difference of nomenclature—yet that the variation between the different forms is properly brought out. Without my seeking it, the list includes the two extreme forms, as I believe them to be, of dark and light—the former represented by a uniformly dark brown bird, the latter by one having the whole under surface of the body, as well as the sides and nape of the neck, of a beautiful cream colour, by virtue of which, and of the salient contrast exhibited between this and the dusky upper surface, it is extremely handsome, not to say beautiful—one of the handsomest of all our British birds, in my opinion. Both the extreme forms are uncommon, whilst of the many forms between them hardly any two seem to me to be quite alike. The extreme forms are, or much more so; and this would make them more numerous than any one of the others, though less so than all of these collectively. Also the extreme light, or handsome, form seems to me to be commoner than the extreme plain one. Should not a bird like this be described as multimorphous rather than as dimorphous? I believe that there exists as perfect a series between the two extreme forms as between the least eye-like and the most perfect eye-feather in the tail of the Peacock, as pointed out by Darwin, and exhibited in the Natural History Museum at South Kensington. The eye, however, insensibly masses the less saliently distinguished individuals together, so that those in whose plumage the light colouring is more *en évidence* than the dark go down as the light form, and *vice versa*. Moreover, the more *prononcé* a bird is in one or another direction the more it is remarked; so that perhaps the intermediate shadings are forgotten, on the same principle as that by which extreme characters in any direction are more appreciated than less extreme ones by the breeders of fancy birds—pigeons, poultry, &c. The uniform brown form, however, as being less striking (though extreme at one end), is not, I believe, so much noticed as those various dunnish shades

which have, in my view, been classed all together as the dark variety. Still, with all this, I confess it is a puzzle to me how a bird, the individuals of which differ so greatly and indefinitely, can have come to be considered as merely exhibiting two forms of colouring.

As far as I remember, all the nestling birds which I have seen have been merely brown, without any admixture of cream under the fluff; but I have not seen very many. When older and able to fly, but still young, all that I have seen have had a colouring of their own—for their plumage has borne a considerable resemblance to that of the Great Skua (*Stercorarius cataractes*), being mottled on the back with two shades of brown, a darker and a lighter one. I got the effect of this when I watched young birds flying or standing, and one day I caught one whose wing had been injured, and saw that it was so. This resemblance is increased by such birds wanting the lance-like feathers (or feather) in the tail. This mottled brown is the only kind of colouring which I have seen in these immature but comparatively advanced birds. Certainly, compared to the old ones, there were but few of these to be seen on my late visit. Had there been only one, however, that exhibited the ordinary light or dark form of plumage, or any sensible approach towards it, I believe I should have noticed it, as I was for seventeen days on the spot. My impression is that in the still younger birds this mottling was either absent or not so noticeable. At any rate, I have no clear recollection of it.

My own explanation of all these facts is that *Stercorarius crepidatus*, having been originally a plain homely-coloured bird, like the Great Skua, is being gradually modified, under the influence of sexual selection, into a most beautiful one, as represented by the extreme light, or half-cream, form. Natural selection seems here excluded, or, at any rate, extremely doubtful; and, if it be proposed that the lighter (or darker) birds have the more vigorous constitutions, I can only say that I believe it would be extremely difficult to produce any kind of evidence in favour of the suggestion. Without evidence, such a view is a mere supposition, and therefore not worth while considering. The main facts suggest choice in a certain direction. There is a gradation of colour and pattern connecting two forms—one

plain, the other lovely. This suggests a passage from one to the other, and if the plain form most resembles the young bird in colouring (which is my own experience), whilst the young bird resembles, more than any old one, an allied plainer species, this seems to make it more than likely that the passage is from the plain to the lovely, and not from the lovely to the plain. Supporting and emphasizing this, we have the absence of those lance-like feathers in the tail of the young bird which give so marked a character to, and add so infinitely to the grace of, the old one. Of what use can this thin projection an inch or so beyond the serviceable fan of the tail be to the bird? Seeing how well every other bird does without it, can we suppose it to be of any service? Its beauty, however—which one misses dreadfully in the young flying bird—is apparent to anyone, and it goes hand in hand with an increased and ascending scale of beauty in colour. All this seems to me to point towards sexual selection, since I am personally a believer in the reality of that power, having never heard or read anything against it so convincing to my mind as what Darwin has said for it, nor seen anything that has appeared to me to be inconsistent either with his facts or his arguments.

SEA-BIRDS AND PLOVERS NOTICED IN LANCA-SHIRE AND CUMBERLAND.

By THOMAS HEPBURN.

THE primary object of this trip—Walney Island, June 1st-3rd; Ravenglass, June 4th-5th; Boot, June 6th-9th; and Arnside, June 10th-12th, 1901—was to make myself better acquainted by actual observation with the breeding habits of some of our sea-birds and Plovers. There are numerous colonies of Black-headed Gulls and Terns in the sand-hills and marshy parts of Walney Island, and in the same style of country on either side of the mouth of the Esk at Ravenglass. At Foulshaw Moss, near Arnside, there is a large colony of Lesser Black-backed Gulls; and the margins of the tidal estuaries at Ravenglass and Arnside, and the sea beaches at all three places, form suitable haunts for various Waders and shore-loving birds. I found, however, that I had timed my visit too late for the birds breeding in the hills round Boot.

RINGED PLOVER (*Ægialitis hiaticula*).—*Walney Island*. Pairs of this bird were fairly numerous along the stretches of shingle beach which form part of the coast-line of the island.

Ravenglass. I found a nest in the sand-hills here, not far from the sea, containing three eggs; a cockle-shell, $1\frac{1}{2}$ in. diameter, apparently taking the place of the fourth egg. The nest was a careless hollow scratched out of the sand, $5\frac{1}{2}$ in. diameter by $1\frac{1}{2}$ in. deep, with a few pieces of broken shell in the bottom. A nest was also shown me, which was made close under the shelter of an overhanging sand-hummock, and from which the young had just been hatched. The nest-hollow was scraped out of the sloping side of the hummock, with its projecting top about a foot over the nest, completely covering it from the sky, while some coarse grass drooping over partly concealed it in front. I could see the footprints of the young birds going away from the edge of the nest, and picked up

a piece of a Ringed Plover's egg-shell within five yards of it. The fisherman who showed it to me said that it had only contained three eggs.

GOLDEN PLOVER (*Charadrius pluvialis*).—I saw a single bird of this species on the hills near Boot.

LAPWING (*Vanellus vulgaris*).—There were scattered pairs of these birds all over Walney Island; also at Ravenglass, and on the hills round Boot. At Arnside there were several fair-sized flocks feeding on the sands, as well as breeding pairs.

OYSTERCATCHER (*Hæmatopus ostralegus*).—*Walney Island.* I examined four nests of this species on Walney Island, where the birds were fairly common. Two of these nests were on patches of shingle, one being a little way above high-water mark, and the other in the centre of the sand-hills (amongst which there are a good many flat stretches covered with shingle). They were shallow hollows scratched out amongst the stones, with a few pieces of broken shell round the rims. They both contained three eggs. The hollows measured about 7 in. in diameter and 1½ in. deep. Of the other two nests, one was on a hillock covered with short turf, and the hollow, which measured 7 in. diameter by 2 in. deep, was thickly lined with bits of dead thistle-stems, and contained two eggs; the second was a shallow depression amongst some heather, 4 in. diameter by 1 in. deep, and also contained two eggs. One of these clutches of two eggs I blew, and found to be very hard-set; they must therefore have been the full complement of eggs in that case. In another case of one clutch of three I found one egg quite fresh, one with a distinct chicken formed in it, and one in a condition midway between the two; this would lead one to suppose that the bird must have started sitting as soon as the first egg was laid. I found a nestling in one part of the beach; it was crouched down on the pebbles, with its head stretched straight out in front. The general colour of the down was almost black, with a few streaks and mottlings of brown. The bill was black, and the feet flesh-coloured. There were several large flocks of these birds round the coast of the island, and these I took to be non-breeders.

Ravenglass. The Oystercatcher was if anything even commoner at Ravenglass than on Walney Island. In an hour's walk among the sand-hills on the south side of the Esk I found no fewer

than four nests, one containing three eggs, two but two eggs, and the fourth only one egg. Three of these nests were hollows scratched in the sand (in two cases amongst the *débris* thrown up by the tide), with a few little pieces of broken shell scattered over the bottom of the hollow; the fourth nest was in a patch of shingle, and was carefully paved all over with small flat stones. These nests were all practically the same size, about 7 in. diameter by 1½ in. deep.

Arnside. I saw one pair of Oystercatchers here, which had either young birds or eggs, near some marshy land along the estuary of the Kent.

COMMON SNIPE (*Gallinago cœlestis*).—I put up a single bird of this species near Ravenglass in some marshy land; and I also saw the bird at Arnside.

COMMON SANDPIPER (*Totanus hypoleucus*).—*Boot.* There were a pair or two of these birds round the edges of most of the tarns in the hills. On the edge of Devoke Water I found an old bird with nestlings just able to run. The down of the young was a reddish sandy-brown colour, with sepia streaks and spots; the bill was black, and the feet and legs were a dull greyish flesh-colour. The old bird made a great fuss while I was looking at the young ones, coming within two or three yards of me, and uttering a loud piping note all the time.

Arnside. I found a nest of this species in some marshy ground near Foulshaw Moss. The bird sat very close, and only flew off when I was within a pace of the nest. It flew straight away, and did not come back either while I was examining the nest, or was in the vicinity of it. The nest was rather a deep hollow scratched out amongst a thick growth of sorrel and grass, which quite concealed the eggs when the bird flew off. It measured 4 in. diameter by 2 in. deep, was lined with a few pieces of dead grass, and contained four eggs.

REDSHANK (*T. calidris*).—I saw a few pairs of these birds at Ravenglass and at Arnside, where they had evidently been breeding; but there were no great numbers at either place.

COMMON CURLEW (*Numenius arquata*).—There were flocks of Curlews on the coast of Walney Island and at Ravenglass.

Boot. There were here several pairs of breeding birds about the hills. One pair which I watched for some time had

young which could fly quite well. The old birds flew round at a safe distance, very often settling on opposite side of me, keeping just out of sight over the rise of the hill, calling to each other with a soft musical whistle all the time. At another spot a pair were particularly noisy and bold, coming quite close to me, and whistling loudly. Several times I noticed one of these birds flying at a great height, apparently crossing from one hill-top to another, uttering a prolonged and varied whistle, which might almost be called a song.

Arnside. The keeper at Foulshaw Moss told me that when the Curlews flew around, as in the two instances mentioned above, and as a bird was doing while I was speaking to him, it was a sure sign that the eggs were hatched out, and that their young were somewhere near. When they had eggs, they were much quieter in their behaviour. There were three or four pairs breeding about Foulshaw Moss.

SANDWICH TERN (*Sterna cantiaca*).—The Sandwich Tern was breeding in the sand-hills at Ravenglass. It is said to breed also on Walney Island, but I was unable to find it there, although I searched carefully for it.

Ravenglass. I was told here by one of the fishermen that there were about fifty pairs of these Terns breeding in the sand-hills, in eight or nine separate clumps, amongst the large colony of Black-headed Gulls. During one afternoon I found four nests in one spot, and ten nests in another. They were placed very close together, the clump of four covering an area of about one square yard, and the ten nests covering a proportionately small area. In every nest the young were just coming out of the eggs, the clutch having been either three or two eggs. The down of the young was a light grey colour speckled with black. The nests were very slight hollows made in the loose sand, a few of them having a few pieces of dry grass arranged round the edge. The sand was so loose and dry that in many cases almost all trace of nest had disappeared; but where the shape of the nest could be made out, it measured about 5 in. diameter by $\frac{1}{2}$ in. deep. Both these clumps of nests were surrounded by Black-headed Gulls' nests and eggs. The cry of this bird was quite different to that of the Common or Arctic Tern, being shorter, sharper, and stronger. The old birds were

very bold, and swooped quite close to my head while I was examining their nests.

COMMON TERN (*S. fluvialis*) ; ARCTIC TERN (*S. macrura*).—Both these Terns were breeding on Walney Island and at Ravenglass. I found them most difficult to distinguish from each other, and of course when they were flying overhead in numbers, even although one thought to distinguish individual birds, it was quite impossible to tell which eggs belonged to them.

The Terns' nests on Walney Island were in close proximity to those of the Black-headed Gull, some being in the sand-hills, and some on the marsh, or "moss"; but there were a few small colonies in secluded spots of turf and shingle, quite separated from the large colonies. The Terns' nests at Ravenglass, except the Sandwich Terns, were on a stretch of dry grassy land at the foot of the sand-hills, and some distance from the Black-headed Gulls. I found that the nests which were made on the sand generally had a tolerably thick pad of coarse grass as a lining (there is a quantity of coarse grass growing on the sand-hills both on Walney Island and at Ravenglass, of which the dead blades seem to be found a useful article by the Terns and Gulls), the hollow thus lined measuring about 4 in. diameter by $\frac{1}{2}$ - $\frac{3}{4}$ in. deep. Most of the nests made on the shingle had no lining at all, the nest-hollow being of about the same dimensions. The nests made on the short turf exhibited rather deeper hollows, with sometimes the lining of a few blades of the surrounding grass, but as often no lining at all.

I came upon two small outlying colonies, consisting of about half-a-dozen pairs of birds, in different parts of Walney Island, and spent some time watching them with my glasses until I satisfied myself that all the Terns breeding in these two spots were Arctic Terns. One of the small colonies was on a stretch of short turf close to the sea-front, and the other was on a small patch of shingle about one hundred yards inland. I examined four nests of those on the grass, and found them to contain two and three eggs, the nest-hollows being generally as already described. The eggs of one clutch which I took measured 1·6 in. by 1·15 in. In the colony on the patch of shingle I examined three nests, two of which contained three eggs, the other only two.

One of the nests containing three eggs had also a stone about the size of an egg placed in the middle of it. A clutch of three averaged 1·61 in. by 1·16 in.; but measurements of two isolated clutches are not much on which to base arguments. I did not notice any nestling Terns.

LESSER TERN (*S. minuta*).—*Walney Island*. I found one colony of these birds on a part of the beach. I examined two nests containing two and three eggs respectively. Both nests were on the shingle, just above high-water line; and the clutch of two eggs was amongst some large pebbles, really only just lying in the depression caused by the shape of the stones, without any attempt at scratching out a hollow. There was no kind of lining in either case, the eggs being laid on the bare stones.

Ravenglass. Here there was also a colony of Lesser Terns breeding on a shingly piece of beach to the north of the estuary of the Esk. I did not search for nests, but I accidentally found a single egg laid on the pebbles in a small hollow just above high-water mark.

I saw no nestlings of this species.

BLACK-HEADED GULL (*Larus ridibundus*).—*Walney Island*. There are large colonies of these birds at each end of the island, both on the sand-hills and on the moss. The coarse grass growing on the sand-hills forms little ridges and steps on the sides of the hummocks, and make a favourite resting-place for the Gulls' nests, which are thus built, as it were, in terraces. The dead blades of the grass give the bulk of the building material that the birds require, and with it they make, as a rule, a fairly substantial but shallow cup-shaped nest, resting directly on the sand. Amongst the colonies on the moss there will often be nests with a considerable foundation of rubbish and dead sticks, varying from a few inches to a foot in height. The biggest I noticed measured fully two feet across the base, and was a good twelve inches high. The rule with the nests on the moss was to have a foundation of sticks under the cup of grass, while the method in the sand-hills was for the cup of grass to be laid right on the sand without any materials underneath it. The inside measurements of the nests varied from 6-7 in. diameter by 1½-2 in. deep. Most of them had clutches of three eggs.

There were fresh eggs, eggs in all states of incubation, and also young birds to be seen, sometimes running about, but more generally skulking under the grass. The down of the nestlings is a sandy brown colour, with yellowish streaks and mottlings, and they have the beaks black and the feet flesh-coloured. I found one clutch of abnormally coloured eggs—a very pale washed-out blue, with a few faint brown smudges on them, and one or two thin streaks almost black in colour. Standing over, and looking at them as they lay in the nest, they had the appearance of being pale blue eggs without any markings, and were of course most conspicuous.

The old birds make a considerable noise as one walks through their nests. About ten feet or so overhead fly a crowd of the Gulls, continually chattering, and occasionally swooping downwards at the intruder. Flying at a higher level are the Terns, also uttering all the time their long-drawn cries; and as an occasional Oystercatcher is disturbed, it will fly rapidly round, continually repeating its shrill whistle. The whole place is pervaded by a faint smell somewhat resembling a fowl-house. Visiting a large colony like this is of course full of interest to an ornithologist, but at the same time it rather gives him a feeling of surfeit, and is not to be compared for a moment to the satisfaction and pleasure to be derived from finding an isolated Ringed Plover's nest, after having exercised the patience necessary to watch the old bird on to its eggs.

Ravenglass. Except that all the nests here were situated among the sand-hills, the description of the colonies on Walney Island will do equally well for those at Ravenglass. There are, I should say, rather a larger number of Gulls at Ravenglass, and the process of incubation seemed there to be rather more forward. I caught a young bird in this colony which had strong quill-feathers in its wings, and could almost raise itself off the ground as it fluttered along. All the young birds I handled, at both places, were in capital condition, their bodies being almost round. They looked decidedly ludicrous when running (which they could do well, with a rather waddling action), especially if you got them silhouetted against the sky-line, when they appeared as a round ball with a neck stretched out in front, and two legs moving at top speed underneath. There was nothing whatever

in the picture to remind one of their elegant, and almost slim, parents flying overhead.

Boot. I was astonished at the number of these Gulls to be seen round Boot, mostly scattered about the pasture lands in the valleys, but often also right out on the moors. Their chief occupation seemed to be a search for food, and it was interesting to watch them beating slowly backwards and forwards over the meadows, hunting like a Dog, and now and again dropping on to the ground to pick something up. I was rather inclined to conclude that these birds were non-breeders, and had no connection with the colony at Ravenglass.

Arnside. There were very few Black-headed Gulls to be seen here.

HERRING-GULL (*L. argentatus*).—I saw a few of these Gulls round Walney Island. The bigger Gulls obtain no encouragement from their smaller relatives to frequent any of the colonies. I saw an immature bird, either this species or a Lesser Black-backed, being chased by a mixed mob of Black-headed Gulls and Terns, who gave it a very rough time indeed, until they had driven it out of their own sphere of influence.

I have seen it stated that these birds are to be found breeding on Foulshaw Moss, but I could not find any myself, and the keepers told me that there had been none breeding there for some years.

LESSER BLACK-BACKED GULL (*L. fuscus*).—I saw a few birds of this species round Walney Island.

Arnside. This Gull is here very numerous round the coast, most of those seen being, no doubt, members of the colony on Foulshaw Moss. Foulshaw Moss is rather an interesting stretch of country to visit for the first time. It is a considerable extent of perfectly flat low-lying land, which has evidently at one time been very wet and boggy, but is now intersected by ditches and drains cut into the peaty soil, which must carry off much of the superfluous moisture. I have no doubt, however, that in a wet winter it is still very soft. A great part of the ground is covered by a thick growth of heather, and some other small shrubs which I did not know, while running all through the heather is a thick undergrowth of long moss. There are other stretches of ground overgrown with thick tussocky grass, and

in various directions there are belts, and thin patches of small stunted trees and bushes from six to fifteen feet high. This has somewhat the effect of dividing the whole tract into separate open plains, each of which would be dotted over with single small trees or bushes, quite a number of which I noticed to be dead and bare of leaves. Over this area are scattered the Lesser Black-backed Gulls' nests. They are not by any means placed close together, the distance between the nests averaging from forty to fifty yards. As there are a great number of birds, the area covered by their nests is considerable. I found most of the eggs were hatched out, and there were many of the young ones skulking about in the undergrowth. The colour of the down of these was a sandy yellow with black mottlings, the bill black with a white tip, and the legs and feet lead colour. The down of a bird only just out of the egg was *grey* with black mottlings, which points to a possibility of the colour of the down altering as the age of the bird increases. I examined many nests, which, although tolerably easy to find, required to be looked for. The keeper who was with me found them so rapidly that I scarcely had time to find any myself. He told me that what he looked out for as he walked through the heather was the white downy feathers of the old birds stuck on the heather-bushes. In most cases there were one or more runs or passages up to the nest itself, and, as the bird passes through these, it leaves odd feathers hanging on twigs and branches, and by the quantity of feathers around the nest you can form a rough idea as to the state of the incubation of the eggs. There were a few nests with two eggs, but the majority had three in them. All that I blew contained fully-formed chickens, and the keeper told me that there were birds laying as early as the beginning of April. At the same time none of the young birds I saw were able to make any attempt at flight. There was a considerable similarity in the construction of the nests, which showed signs of much more care than in those of the Black-headed Gull, the material forming them being almost felted together into concave pads, the hollows measuring roughly 9 to 10 in. diameter, by $1\frac{1}{2}$ to $2\frac{1}{2}$ in. deep. One nest I examined was placed between some big tussocks of coarse grass, the materials used for the pad being moss, grass-blades, small twigs, and a few

white feathers, which made a thick and soft bed for the eggs. The shallow cup measured 9 in. diameter, by $2\frac{1}{2}$ in. deep. While I was looking at this nest the old bird was making very vigorous swoops unpleasantly close to my head, uttering an angry cry each time it descended. Another nest, which was placed on bare ground in one of the clumps of small bushes and trees, was made of moss, twigs, and dead leaves, formed into a fairly solid mass, which measured at the base 15 in. diameter, the cup being the same dimensions as the other one, the top edge of the rim of the cup 5 in. high from the ground. The nests amongst the heather were much the same as those already described. In several places I noticed heaps of a small pink bivalve shell.

GUILLEMOT (*Uria troile*).—I found a dead body of a Guillemot on the beach at Walney Island.

BIRDS COLLECTED AND OBSERVED IN THE DARBHANGA DISTRICT, TIRHOOT, BENGAL.

BY GORDON DALGLIESH.

(Continued from p. 215.)

Crocopus phænicopterus, Lath. (Bengal Green Pigeon).—Very common. Breeds in April, May, and June. These Pigeons are, as a rule, gregarious, and go about in enormous flocks.

Columba intermedia, Strickl. (Indian Blue Rock-Pigeon).—Very common about old buildings and ruins. They breed throughout the year.

C. livia, Gmel. (Blue Rock-Pigeon).—One out of a pair was shot at Dalsingh Serai in June, 1900. It was unfortunately too badly hit to preserve.

C. eversmanni, Bonap. (Eastern Stock-Pigeon).—Occasionally seen during the cold weather.

Turtur ferrago, Eversm. (Indian Turtle-Dove).—An uncommon winter migrant.

T. suratensis, Gmel. (Spotted Dove).—Very common. Breeds throughout the year. It lays two eggs, very seldom three.

T. risorius, Linn. (Collared Turtle-Dove).—Quite as common as the last. Breeds throughout the year. At Hattowrie Factory, Darbhanga, in May, 1901, I saw a Dove which I take to be a hybrid between this species and *T. suratensis*. The Dove was quite close to me feeding on the ground. The wings and upper plumage were that of *T. suratensis*, the breast was like that of *T. risorius*, and it had a distinct black collar. In size it was intermediate between the two forms.

Enopelia tranquebarica, Herm. (Red Turtle-Dove).—This beautiful little Dove is the rarest species to be found. I have only twice come across their nest.

Excalfactoria chinensis, Linn. (Blue-breasted Quail).—I once saw a small Quail which I took to be this species at Dalsingh Serai

Mr. Inglis records having seen another at Hattowrie Factory, Darbhanga.

Coturnix communis, Bonn. (Common Quail).—Common in February and March, though the year (1901) was remarkable for its scarcity of Quail. I never saw a single specimen, neither were any brought me by native fowlers. Some are probably resident. Mr. Inglis procured one egg laid by a captive bird.

C. coromandelica, Gmel. (Black-breasted Quail).—Two eggs of this species taken in September by Mr. Rawlins, of this district, and sent to me. Several birds of this species were shot at Dalsingh Serai, so I have been informed, many years ago.

Francolinus vulgaris, Steph. (Black Partridge).—Usually one or more pairs are to be found in any grass jungle during the cold weather, but in summer they scatter, and are found among crops. They are the best birds I know at running, and are very difficult to flush, reminding one of the English Corn-Crake in this respect. They are very fair eating if hung for a day or two. One bird I shot had a number of large black ants in the crop.

F. pondicerianus, Gmel. (Grey Partridge).—A rather scarce bird, and I have only shot it twice.

Turnix dussumieri, Temm. (Little Button-Quail).—Mr. Inglis informs me that he had a pair of this species snared at Jainagar.

T. tanki, Blyth (Indian Button-Quail).—Not often seen, probably on account of its shy skulking nature.

Porzana pusilla (Eastern Ballion's Crake).—A male of this species was snared by native fowlers at Hurnella Jheel, Darbhanga, and brought to Mr. Inglis, who afterwards gave me the skin.

Rallus aquaticus, Linn. (Common Water-Rail).—One specimen (a male) was shot by me at Hattowrie Factory, Darbhanga, on Feb. 12th, 1898. The only other places where this bird has been recorded from India are Gilgit (Scully), Kulu (Hay), and Dera Dun (Hume). Mr. R. George killed a specimen near Skikarpur ('Fauna of Brit. Ind., Birds,' vol. iv. p. 160). One (a female) procured by Mr. Jesse at Lucknow was recorded in the 'Field.'

R. indicus (Indian Water-Rail).—A Rail, which I think

was this species, was seen by me on a small pond near Bunhar Factory, Samastipur, in February, 1899. I fired at it, but it was only wounded, and escaped by diving; and, though I had men searching for a long time, they failed to find it.

Amaurornis phoenicurus, Penn. (White-breasted Water-hen).—Very common. Found by nearly every piece of water. It is an exceedingly noisy bird, and its loud harsh cry is heard both day and night. In the year 1900 I was stopping at a house, the garden of which was inhabited by a pair of these birds, which kept me awake most of the night by their cries. They breed during July and August, making a nest of rushes, placed as a rule, near water. They are very pugnacious birds, and I have often seen them fighting furiously with each other; a pair were so engaged on one occasion, that I approached to within a few yards of them before they were aware of my presence.

Gallinula chloropus, Linn. (Moorhen).—Common. Breeds in August.

Porphyrio poliocephalus, Lath. (Purple Moorhen).—Fairly common. It breeds during July and August in marshes and rice-fields. The nest is a huge mass of rushes or rice placed on water.

Fulica atra, Linn. (Coot).—Very common during winter, and a few remain to breed.

Grus antigone, Linn. (Sarus Crane).—Occasionally seen during the cold weather.

G. communis, Linn. (Common Crane).—Once seen near Hattowrie Factory, Darbhanga, in December, 1897.

Anthropoides virgo, Linn. (Demoiselle Crane).—A not very common cold weather migrant. Often heard at night as they fly to their feeding-grounds.

Sypheotis bengalensis, Gmel. (Bengal Florican).—I only saw one specimen, which was flushed from some heavy grass jungle.

Ædicnemus scolopax, Gmel. (Stone-Curlew).—Very common. Breeds, according to Mr. Inglis, in April.

Esacus recurvirostris, Cuv. (Great Stone-Curlew).—One seen by Mr. Inglis on the banks of the Kamla, and one shot by me at Hattowrie Factory, Darbhanga.

Cursorius coromandelicus, Gmel. (Indian Courser).—Very common in some parts during winter. They run very swiftly, and their flight resembles that of the Lapwing. They are excellent birds for the table.

Glareola lactea, Temm. (Small Indian Pratincole).—I have a pair of these birds given me by Mr. Inglis. I have never come across any myself.

Metopidius indicus, Lath. (Bronze-winged Jacana).—Not uncommon. They breed in weedy tanks in July and August.

Hydrophasianus chirurgus, Scop. (Pheasant-tailed Jacana).—Very common on all marshes. It breeds in July and August, and sometimes in September. They lay from three to four eggs. The cry of this bird resembles the "mewing" of a cat.

Sarcogrammus indicus, Bodd. (Red-wattled Lapwing).—Very common. Breeds from March to May. They are noisy birds, and are well known on account of their cry, which resembles the words "did he do it."

Sarciophorus malabaricus, Bodd. (Yellow-wattled Lapwing).—A rather scarce bird. I have not often seen it.

Hoplopterus ventralis, Wagl. (Indian Spur-winged Plover).—Very common on the banks of rivers. A nest found by Mr. Inglis's collectors in May contained two eggs.

Charadrius fulvus, Gmel. (Eastern Golden Plover).—Very common in some parts in winter. They are extremely wild birds, and difficult to approach.

Ægialitis mongolica, Pall. (Lesser Sand-Plover).—Common on ploughed lands, and on the banks of rivers.

Æ. alexandrina, Linn. (Kentish Plover).—A common cold weather migrant. A specimen shot by one of Mr. Inglis's collectors in April was in full breeding plumage.

Æ. dubia, Scop. (Little Ringed Plover).—Common on the banks of large rivers.

Himantopus candidus, Bonn. (Black-winged Stilt).—A common winter migrant.

Recurvirostra avocetta, Linn. (Avocet).—Rare. One brought to me by a native fowler in February, 1900.

Numenius arquata, Linn. (Curlew).—I shot one pair in February, 1900, and saw a few others.

Limosa belgica, Gmel. (Black-tailed Godwit).—Several seen

at Dalsingh Serai in February, 1900. They were feeding in an enormous flock. Thirteen birds were the result of one shot fired.

Totanus hypoleucus, Linn. (Common Sandpiper).—Very common in the cold weather by nearly every piece of water.

T. glareola, Gmel. (Wood Sandpiper).—Very common from August to March.

T. ochropus, Linn. (Green Sandpiper).—More abundant than *T. glareola*.

T. stagnatilis, Bechst. (Little Greenshank).—Very rare. I only got one specimen.

T. glottis, Linn. (Greenshank).—Abundant during the cold weather.

T. fuscus, Linn. (Spotted Redshank).—A common cold weather migrant, arriving in October.

Pavoncella pugnax, Linn. (Ruff and Reeve).—Rare. I have a pair in my collection, given me by Mr. Inglis.

Tringa temmincki, Leisl. (White-tailed Stint).—Very common in the cold weather, in large flocks.

T. minuta, Leisl. (Little Stint).—Not quite as common as the last.

T. alpina, Linn. (Dunlin).—A male was shot by me in February, 1898. It was the only one secured out of a small flock.

Gallinago cœlestis, Frenz. (Common Snipe).—Very common from September to April.

G. sternura (Pin-tail Snipe).—Several shot near Darbhanga in December, 1900.

G. gallinula, Linn. (Jack-Snipe).—I shot several of this species in January and February, 1900.

Rostratula capensis, Linn. (Painted Snipe).—I only got one specimen in four years.

Larus ichthyaëtus (Great Black-headed Gull).—I saw this bird twice, but was unable to shoot it.

L. brunneicephalus (Brown-headed Gull).—Mr. Inglis obtained one specimen of this bird in the distict.

Hydrochelidon hybrida, Pall. (Whiskered Tern).—A common resident. Mr. Inglis found a colony of these birds breeding, and gave a very interesting account of it in the Bombay Natural History Society's Journal.

H. leucoptera, Meisn. & Schinz. (White-winged Black Tern). I shot a bird which I identified as this species, but unfortunately lost the skin.

Hydroprogne caspia, Pall. (Caspian Tern).—I once saw a number of these birds, but was unable to procure any.

Sterna seena, Sykes (Indian River Tern).—A very common resident.

S. anglica, Mont. (Gull-billed Tern).—I have on two or three occasions seen this species.

S. melanogaster, Temm. (Black-bellied Tern).—A common resident.

Rhynchos albicollis, Swains. (Indian Skimmer).—Not uncommon on large rivers.

Pelecanus philippensis, Gmel. (Spotted-billed Pelican).—Fairly common during the monsoon.

P. roseus, Gmel. (Eastern Pelican).—Mr. Inglis procured one specimen of this bird.

Phalacrocorax carbo, Linn. (Great Cormorant).—I only got one pair of these birds.

P. javanicus, Horsf. (Little Cormorant).—Very common on all large pieces of water, and in one place I counted some hundred, all fishing together.

Plotus melanogaster, Penn. (Indian Darter).—One was seen near Jhangapur.

Ibis melanocephala, Lath. (White Ibis).—Not very common, though I have seen large numbers occasionally in the cold weather.

(To be continued.)

NOTES AND QUERIES.

MAMMALIA.

White-beaked Dolphin at Great Yarmouth.—A White-beaked Dolphin (*Delphinus albirostris*), 54 in. in length, was brought in on July 12th; it was taken in the nets of a herring-lugger the night previous. With the great increase of steam drifters cetaceans appear to have become comparatively scarce.—A. PATTERSON (Ibis House, Great Yarmouth).

AVES.

Notes from Yarmouth.—Bird-life in this locality during the past dreary summer and autumn has not presented many interesting episodes. My month's holiday on Breydon mud-flats in July and August afforded as blank a record as any I ever remember.

A late Oystercatcher (*Hæmatopus ostralegus*) flew past me on Breydon on the night of June 20th; and up to June 25th I never saw fewer Redshanks (*Totanus calidris*), which nevertheless had a good time in the upper marsh-lands, for they were reported numerous on the Beccles river, and in August were around my location on the flats in exceedingly gratifying numbers. I suspected them of feeding on *Corophium longicorne*, a species abounding in the surface of the ooze, and on small red mudworms beneath it. Lesser Terns were familiar objects in May and June, the smart little fellows fishing all around one, as if man had never an evil thought, and they were attracted still closer by an imitation of their note. Two pairs would, I believe, have nested with us on a flat they took a fancy to; they roosted on somewhat dry spots. There at night, right through May, they fished in its vicinity, and when it was too rough, angled in the semi-brackish ditches for Three-spined Sticklebacks, and even seemed to prefer fishing there when the Herring-Syle appeared in the tidal water. I had more than one happy moment watching them dropping upon their prey as I skulked in the grass at a ditch-end. They seldom missed a "stoop." But their household anticipations were suddenly overthrown by the incoming of rather full spring tides, which washed them and their prospects off the flat together. Nevertheless, some were seen about until June 27th. As early as July 7th several came

back again from a spot best not localised. On Aug. 21st the old birds capturing juvenile Herrings for their young was a most interesting observation, while the eager and fussy solicitations of the young Terns were charming. They followed their parents awing, preferring to drop on to the surface of the water to receive their dole. Two or three score used Breydon up to the end of August, when, alas ! some guns arrived to break up these happy family parties. If men would only learn how much more delightful and bewitching it is to look down the inside of a field-glass than to squint down a gun-barrel, what greater happiness would obtain to all parties concerned ! A Caspian Tern (*Sterna caspia*) turned up on July 24th, and a young Black-headed Gull (*Larus ridibundus*) on July 2nd. Two Cuckoos were piping early on the morning of July 3rd. One gave the cry in the natural key ; the other more shrilly, and half a tone higher ; and, curiously enough, unaided by an echo, piped "cuck-cuck-oo!" I never heard this cry before ; have any of your readers ? I had ample opportunity for hearing many a repetition of it.

The Heron is a bit of a wag in his way. One, having satisfied the cravings of hunger, amused himself catching such little Eels and Flounders as came near his submerged feet, letting them go again—probably with a caution ! Imitating the cry of a passing youngster, in the dusk on Aug. 4th, I decoyed him to within a very short distance of my head. Greenshanks were fairly numerous "on call" during August. Knots, Turnstones, Curlew-Sandpipers, in some numbers too—the Knots so tame that a couple I passed and repassed would not flit from a bit of floating wood they were resting on until forced to fly by water repeatedly splashed on to them by my oar ; they seemed to wonder, as I did, what business of mine it was to interfere. Only one Spoonbill was observed on Breydon this year, which, being innocent enough to wander to the marshes, was shot.—A. PATTERSON (Ibis House, Great Yarmouth).

Wood-Sandpiper in the Orkney Islands.—I think perhaps it may be of interest to record the occurrence of the Wood-Sandpiper (*Totanus glareola*) in the Orkney Islands. A friend of mine shot one in my presence on the island of Eday on Sept. 1st. It rose out of a Snipe-bog, and at the moment of firing he took it for a Snipe ; but, on examining it, we soon identified it as a Wood-Sandpiper. Both Wood and Harting say that the bird is rare in Scotland, so perhaps this note may be worth printing. The bird was tame, but it had an even more erratic flight than the Snipe.—C. S. BUXTON (Newtimber Place, Hassocks).

PISCES.

Notes from Yarmouth.—Several Cuckoo Rays (*Raia miraletus*) were brought into Yarmouth in April. An enormous Haddock (*Gadus aeglefinus*)—length 2 ft. 9 in., weight $10\frac{1}{2}$ lb. when “gutted”—was landed at about the same time. Early in the summer an Eckstrom's Topknot (*Zeugopterus unimaculatus*) was captured in a shrimp-net off Yarmouth. Length, $5\frac{1}{2}$ in. This is new to the fauna of this district. The fish was saved for my inspection, but was unfortunately too dry for proper preservation.—A. PATTERSON (Ibis House, Great Yarmouth).

INSECTA.

Making the best of Difficulties.—A curious instance of making the best of difficulties in insect-life came to my knowledge a few days ago. A young lad had made for himself a breeding-cage for larvæ, the bottom, or tray, being of stout brown-paper board, and the four sides and the top covered with gauze, which was supported by a straight stick, some eight or nine inches high, at each corner. These uprights were about the thickness of a lead-pencil, or possibly a trifle more. Into this cage he put some larvæ of *Dicranura vinula*. Two of the larvæ made their cocoons on the face of these corner sticks, which did not offer a surface of more than a quarter of an inch. One larva escaped into the room, and was afterwards found to have made its cocoon on the leg of an oak chair, or stool, I forget which. I think both these expedients are worth notice.—W. OXENDEN HAMMOND (St. Albans Court, near Dover).

[The above experience is not uncommon. In ‘The Zoologist’ (1863, p. 8785) there is a record of these larvæ “forming their cocoons upon those of their predecessors.” In one corner of a box there were no fewer than six clustered together.—ED.]

ANIMAL SENSE PERCEPTIONS.

By this mail I am sending two specimens (male and female) of a bug which was too common in every garden in Johannesburg last summer, and which is doubtless well known to you.* In ‘The Zoologist’ (ante, p. 161) is an interesting article by Mr. Distant, under the heading “Biological Suggestions.” As bearing on the question of the protection afforded to insects by nauseous smells, the following facts may be of interest:—The bug referred to above

* *Holopterna alata*, Westw., belonging to the Fam. *Coreidæ*.—ED.

is possibly a recent introduction here,* as it has lately appeared in enormous numbers, especially during the war period, when most people were absent from their houses and gardens in Johannesburg. It is a rather large insect, and from the damage it does to many plants, including dahlias, roses, salvias, wistarias, the young shoots of Japanese privet, and even of almond and apricot trees, it readily attracts attention. Like so many of its kind, it is possessed of a most unpleasant smell—a smell of a nastiness and penetration surpassing that possessed by any other insect I am acquainted with. Moreover, it has the power, which it seldom neglects to use when opportunity offers, of squirting out, apparently with some accuracy of aim, a most offensive and disgusting fluid, which appears to be the source of the unpleasant smell referred to.

In spite of its size this insect is not readily seen unless looked for. Its angular outline and general colouration are distinctly protective, and, although strong on the wing, it has the habit, like some other protectively coloured insects, of letting go its hold of a plant, and dropping to the ground, where it lies perfectly still in whatever position it has fallen. It is then very difficult to distinguish among dead leaves, twigs, and pebbles. From its extremely offensive smell, and its abundance in every garden, I was inclined to infer that it must be unpalatable to ordinary enemies of insects. I noticed, however, that a Lizard (*Eremias* sp.), of which there were many in my garden, greedily ate some of the bugs I had killed ; another Lizard (*Agama* sp.) declined the dainty morsel, preferring to rapidly pick up the ants which had commenced swarming round the dead bugs. Afterwards I found that my fowls were very eager after the bugs, and seemed to find them very much to their liking. My next-door neighbour had for some time a tame Meerkat (*Suricata tetradactyla*), a little animal possessed of the keenest sense of smell, and it also readily ate these bugs.

The fact that this bug is eaten by various creatures is, of course, what one might expect from a knowledge of its habits and colouration. It is very probable that its disgusting smell does afford it a certain amount of protection from enemies—indeed, it would be hard to account for such highly developed offensiveness except on some such ground of utility ; but it is clearly a case where, to quote Mr. Distant's words, odoriferous protection proves of a “highly partial and uncertain character.”—HAROLD FRY (Rock House, Johannesburg).

* A common Transvaal insect, which I always found about Pretoria.—ED.

REFERRING to the Editor's article on "Animal Sense Perceptions," I kept a Skunk for a pet six or seven years ago which followed me about like a Dog. At first I had to put up a good deal with the smell, but as it grew tame it was only upon great excitement that it emitted this odour, and this did not seem to be so durable as described in some of the quotations in that paper.

Here the natives do not teach the calves to drink out of a bucket, so that they imbibe direct from the cow. When the native milks the cow the calf must be beside him, otherwise the cow could not be so easily milked. If the calf dies, it is skinned and stuffed with straw, and in a rough fashion made lifelike. This stuffed skin is placed beside the boy while milking, so that the cow can smell it, and thus have no objection to the process. Here smell is stronger than sight.—KENNETH J. CAMERON (Namasi, Zomba, British Central Africa).

MIMICRY.

THIS natural phenomenon has, according to Dr. Andrew Wilson, recently received a very novel application in connection with certain gunnery experiments made at Aldershot. "The red coat of the British soldier has long been condemned as a mark for the enemy; hence khaki and greys have come into favour as colours for the protection of the soldier. At Aldershot the experiments were carried out on guns and their limbers, by way of securing concealment when placed against a variety of backgrounds. Six guns were painted red, blue, and yellow. Seen from a distance, the colour-blending rendered them practically invisible. At a distance of 800 yards it is said the outlines of the guns disappear. At 1000 yards they become lost to sight, and their location is impossible. This experiment is strongly suggestive of the Tiger markings, apparently most conspicuous, but harmonising so thoroughly with the surroundings that all trace of the animal is lost."—ED.

NOTICES OF NEW BOOKS.

Ootheca Wolleyana : an Illustrated Catalogue of the Collection of Birds' Eggs formed by the late John Wolley, Jun., M.A., F.Z.S. Edited from the original notes by ALFRED NEWTON. Part II. Picariæ—Passeres. R. H. Porter.

THE first part of this publication was reviewed in 'The Zoologist' for 1865 ! Since then another generation of ornithologists has arisen; but we may well, in more senses than one, congratulate Prof. Newton and ourselves that he is still the spirit of the work. In his preface we are given many reasons why the delay has been unavoidable, and in some respects beneficial to the production of this instalment; and we read with intense satisfaction, which will doubtless be shared by most naturalists, some wise words on classification. Classifications are always more or less propositions, and Prof. Newton remarks:—"The ideal Taxonomy of Birds is beyond the range of my vision. All that is wanted in the present case is care not to break up groups which are believed to be most nearly allied; their sequence signifies little, and in the existing condition of systematic ornithology—if such a phrase be allowable—the most ready way of referring to any species is to look for its name in an Alphabetical Index." We are glad these words bear the impress of his authority.

We are here given an interesting memoir of John Wolley, who, like many more, did much, though he died early. The memoir also observes the real obituary canon. In the record of every life there are facts we want to know; things we ought to know; but other matters of which we ought not to be told. A biography is not an autopsy, or at least should not be.

There are lessons we may find in the notes. How often and how readily mistaken identity is recorded! Wolley relates an instance in connection with the eggs of a Woodpecker; "I

looked at the bird with my glass, and, alas ! satisfied myself (!!) that it was *Picus tridactylus*; but the moment I saw the beautiful eggs brought to daylight I suspected an error, and went back to the boat to fetch my gun, and shot the bird. It turned out to be, as I anticipated, *P. minor*." Even now we can read with enthusiasm the facts as to the breeding habits of the Waxwing (*Ampelis garrulus*), which Wolley was the first to master and describe; while we are told that up to the time of his departure for Lapland in 1853 considerable uncertainty remained as to the colouration of the Redwing's egg.

It will interest aviculturists to learn that the same observer noticed in a wild Snow-Bunting (*Plectrophanes nivalis*) that "she was suffering badly from a distressing complaint, well known to those who keep birds in confinement as 'asthma.'".

References also recur to some well-known names of those now with us no more. We read of Salvin, and he is gone. Hewitson also is mentioned as a good oologist, and it is probable that his reputation as such will outlast his notoriety as a famous butterfly collector and iconographer, a pursuit which occupied all the last years of his life. Altogether the notes in this volume constitute sufficient material for a whole series of modern books on birds, and, the editing being done by Prof. Newton, the records require no further elucidation. There are four coloured plates of eggs, four plates depicting boreal scenes, a portrait of Wolley, and one of L. M. Knoblock, who seems to have been a conscientious professional collector, with a first-hand knowledge of birds.

Zoological Results, based on Material from New Britain, New Guinea, Loyalty Islands, and elsewhere, collected during the Years 1895-97 by ARTHUR WILLEY, D.Sc. Lond., &c.
Part VI. Cambridge : at the University Press.

THIS part is the concluding publication detailing the results obtained by a memorable expedition ; for when the Managers of the Balfour Studentship in the University of Cambridge can despatch an expedition with the avowed object of procuring material for the study of the embryonic development of the Pearly Nautilus, we may safely realize that the real biological

spirit of zoology is not neglected, and that the results of a truly scientific expedition like this one will be remembered when many highly boomed excursions, promoted by wealth and designed for sport, will have been mercifully forgotten.

In this part Dr. Willey gives an interesting personal narrative of his travels, and a special contribution on the subject which was the primary object of the expedition. The Pearly Nautilus is of consummate interest to zoologists. It constitutes one of the "persistent types" that has travelled on practically unchanged from pre-tertiary ages; it possesses an earthly—or marine—tabernacle, perfected probably before the evolution of our own; and of its complete embryonic development we are even now not fully informed. But Dr. Willey has brought this subject within measurable distance of a final determination, and has written the memoir on this animal which is the last for present consultation. As regards the morphology of the structure of Nautilus, our author inclines to an epipodial theory; but here our function terminates, and we must refer the reader to the Memoir itself, which is embellished with nine beautiful plates, beside other textual illustrations.

Our Country's Fishes, and how to know them; a Guide to all the Fishes of Great Britain. By W. J. GORDON. Simpkin, Marshall, Hamilton, Kent & Co., Limited.

THOSE to whom the volumes of Couch, Yarrell, and Day are inaccessible, and who are desirous of a cheap guide to the discrimination of British Fishes, will find this volume a boon. Of course it is a compilation, and made by one who will probably not claim to be a specialist on the subject; but if its aim is clearly understood, and its figures rather than its text be its principal recognition, then the publication will supply a want, and should ensure a very considerable circulation. The plates also are a distinct improvement on those in other publications of the series, and in some instances are successful in portraying the difficult colour-markings of fishes. In Chapter IX., "Genera and Species," will be found a considerable collection of biological and other facts, but we wish that space would have allowed of reference being made to the sources from which they

were derived. In all branches of knowledge authority for statements is indispensable; we want to discriminate between the accepted observer and the accomplished purveyor.

A Glossary of Popular, Local, and Old-fashioned Names of British Birds. By CHAS. LOUIS HETT. Henry Sotheran & Co.

IN our volume for 1899 (p. 190) we drew attention to a small volume written by Mr. Hett, entitled "A Dictionary of Bird Notes, to which is appended a Glossary of Popular, Local, and Old-fashioned Synonyms of British Birds." So useful was this glossary found by all alike that Mr. Hett has now republished the same, very much enlarged, and nearly including 3000 names; "or on an average of between seven and eight for each species." This is a most welcome publication, but we wish that it had been issued in a more durable form, as a paper cover will certainly not survive the constant use to which it will be put.

The Early Life of the young Cuckoo. By W. PERCIVAL WESTELL.
Thomas Burleigh.

THIS small brochure principally recounts the original observations made by Mr. John Craig, of Ayrshire, and contains reproductions of "four remarkable photographs taken direct from nature by J. Peat Millar."

EDITORIAL GLEANINGS.

SAN PETE COUNTY, Utah, offers a rich market for Grasshoppers, for, as the 'New York Times' observes, men, women, and children are engaged from daylight until dark in collecting the pests and shipping them to the cities. The market price is one dollar a bushel, and there seems to be no limit to either the supply or demand. Millions of the insects darken the sun and hover over the gardens and fields, threatening destruction to everything in their pathway. An area comprising 1,800 square miles, in the centre of the richest agricultural section of Utah, is infested by the Grasshoppers. Sections of soil under microscopic test show seventy-six Grasshopper eggs deposited in a piece only two inches square. This is the situation in an entire mountain-walled valley, including fifteen prosperous towns, having a combined population of 20,000 people. The insects are everywhere that they can crawl or fly, and have destroyed the wheat and oat fields, and will soon strip the grasses and trees of every sign of vegetation. The average daily harvest of men and women ranges about thirty bushels of the insects. These are held in "gunny sacks," and measured or guessed as to quantity, and the money paid without a murmur. Business men and farmers have contributed to a fund for the extermination of the Grasshoppers, and have all the people they can secure at work picking them from the grain fields. When a collection of sacks is made the mass is burned on the streets amid the shouts of young and old gathered about the bonfires.—*St. James's Gazette.*

THE little Scottish town of Cromarty has recently celebrated the centenary of the birth of Hugh Miller, son of a Cromarty fisherman, by early profession himself a stone-mason. The observation he had exercised as a stone-mason, and the attention which he had since devoted to geological studies, were embodied in 1841 in 'The Old Red Sandstone, or New Walks in an Old Field,' a book which may fairly be said to have made a deep impression in both the scientific and literary worlds. Written in a stately, lucid style, with vivid passages which proved an eye-to-eye acquaintance with his subject, its con-

clusions bore witness to the originality of its author's researches. The work was illustrated by drawings from his own hand. "The more I study the fishes of the 'Old Red,'" wrote Huxley twenty years after, "the more I am struck with the patience and sagacity manifested in Hugh Miller's researches, and by the natural insight, which in his case seems to have supplied the place of special anatomical knowledge."

In a centenary address, Sir A. Geikie remarked: "Hugh Miller's researches among the fishes of the Old Red Sandstone showed him to be a naturalist and palaeontologist. It was Hugh Miller's 'Old Red Sandstone' that first revealed to him (Sir A. Geikie) the meaning in the commonest stones beneath his feet."

OUR contributor Mr. W. Ruskin Butterfield has recently communicated a letter to the 'Times' on the subject of "The Preservation of our rarer mammals." The following is an extract:—Certain of our native mammals are so rapidly approaching extinction that for some time it has been a matter of the gravest concern to those who are interested in their survival. Unfortunately, in seeking the attention of those to whom, directly or indirectly, the blame attaches, one labours under an obvious disadvantage. On estates where the production of large quantities of game is the "be-all and the end-all," any but a very sparing admixture of carnivorous mammals is out of the question. It by no means follows, however, that the total extirpation of these animals is necessary. I believe a small admixture to be not inconsistent with the best results. In dealing with vermin, game preservers too often lose sight of the zoological aspect of the question. There can be no doubt that carnivores play an important part in the economy of nature. When an admixture of animals (no matter of what class) is subjected to the rapacious attacks of other animals, the tendency must always be for the former to become more vigorous, since those individuals best able to withstand attack survive. I hope this point, which has been insisted upon by many naturalists, will have some weight in the right quarters.

BAVARIAN officers, experimenting with a balloon some 6,000 ft. aloft, noticed a little black speck which seemed to accompany them, and which they thought was one of the cards which they carry for throwing out reports, and that the dropping of the balloon drew it along, but on looking at the barometer they found the balloon was rising, and not dropping. Suddenly, however, a loud chirping showed that it was a Lark, which, flying at this extraordinary height, had been frightened by the balloon.—*Westminster Gazette*.

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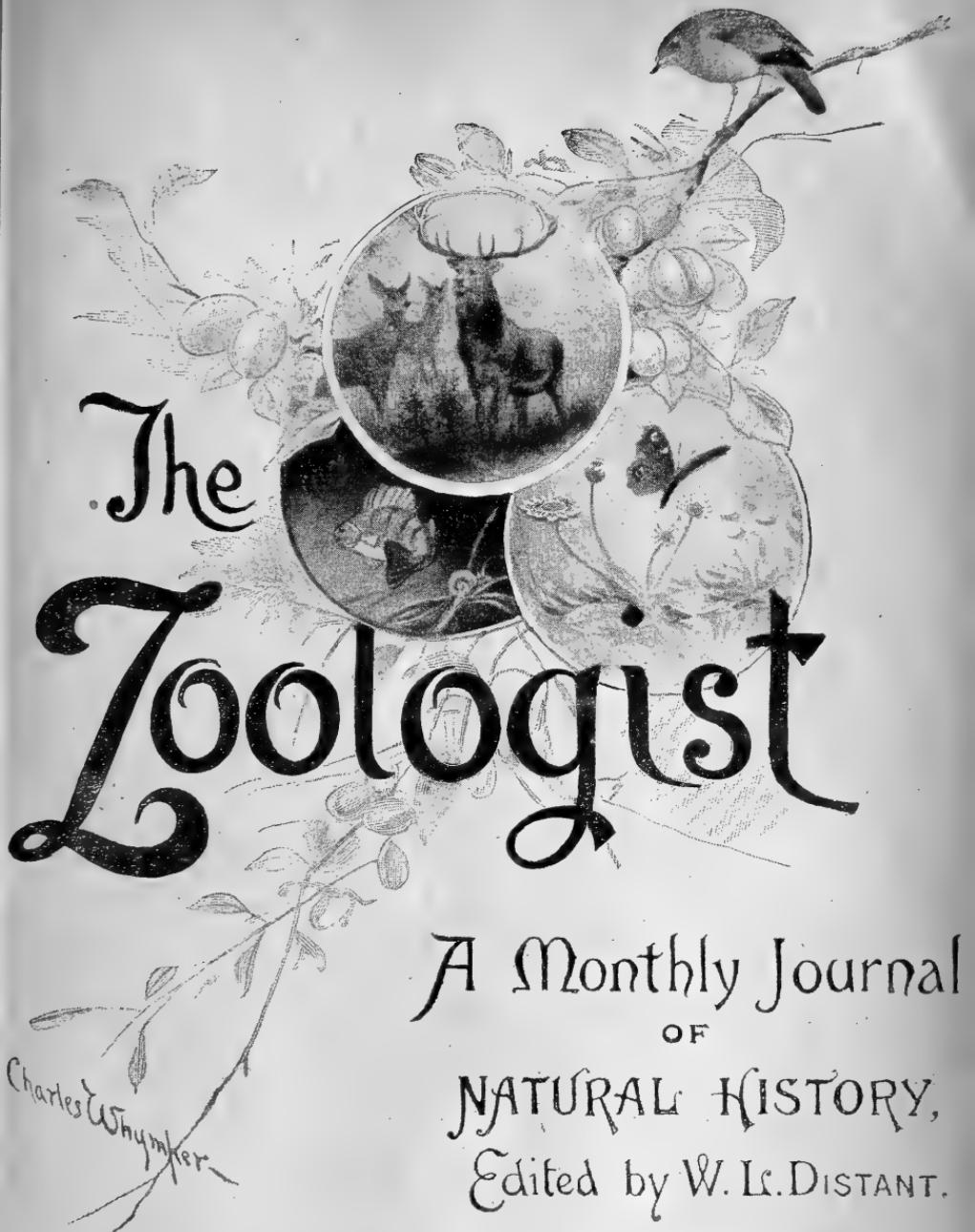
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NOTES ON THE BIRDS OF ANGLESEA.

By T. A. COWARD and CHARLES OLDHAM.

THE Menai Straits, separating Anglesea from the mainland, are so narrow that they alone would not account for any difference in the avifauna of the island from that of the adjacent portions of North Wales; but the character of the country is entirely different from that of Carnarvonshire. The rugged mountains of the Snowdon Range, with their narrow glacial valleys and ice-scooped and volcanic tarns, are replaced by low-lying undulating country, under cultivation of a primitive sort, interspersed with gorse-covered commons, extensive marshes, and shallow reed-fringed pools. With the exception of the isolated Holyhead Mountain, the high land is all to the north-east, from whence the country gently slopes towards the western shores, where the few insignificant sluggish rivers debouch in sandy estuaries.

Anglesea is singularly treeless, and the clumps of trees—mostly ash—which here and there have been planted round the more pretentious houses, bear evidence, in their gnarled trunks and matted branches, of the fierce salt-laden winds that sweep across the island. The sheltered shores of the Menai Straits, however, are well wooded; from Beaumaris to Llanidan are extensive plantations, giving shelter to Warblers and other

woodland birds, rare or unknown in the greater part of the county.

In this paper we have dealt only with the birds observed during short visits in the spring of 1902 to the district lying south-east of a line drawn from Redwharf Bay, through Pentraeth, along the Cefni valley to Malldraeth Bay. Later we hope to treat of other portions of the island, comparing the different faunal areas.

From the shrubberies and plantations in the park at Baron Hill, behind Beaumaris, a thin belt of deciduous trees—beech, ash, oak, and sycamore—fringing the road, extends to the confines of Plas Newydd. Here a well-timbered park, half a mile to a mile in width, lies along the shores to Llanedwen, where for two miles the country is sparsely wooded as far as Llanidan. No one visiting these woods in April and May can fail to be struck, as we were, with the abundance of the Chiffchaff, which far outnumbers any other Warbler. Mingled with the rhythmic notes of this bird were the “long, tender, delicious warble” of the Willow-Wren, and the shivering trill of the Wood-Wren.

Of the Leaf-warblers, the Chiffchaff was undoubtedly the most numerous; though all were abundant, not only in the continuous woodlands between Baron Hill and Plas Newydd, but in isolated Pheasant-coverts further inland. In the woods, too, the Black-cap and Goldcrest were very common, but we only met with the Garden Warbler in one spot—near Llanfair P.G., where we watched a male singing in a thicket on several occasions. The Spotted Flycatcher was abundant, but we failed to find the Pied Flycatcher, which is so common in the Conway Valley at Bettws-y-Coed. The Redstart, in a district apparently admirably suited to its habits, was very rare; we only saw a single bird—between Garth Ferry and Beaumaris. We did not see the hen, but, as we often heard the male singing at this spot, we concluded that she was sitting.

Throughout the whole district the Wood-Pigeon was abundant, being by no means confined to the woodlands. At Plas Newydd, in mid-May, small parties of birds flew at our approach from the beeches with clattering wings. They had been gorging themselves in the tree-tops, and the ground beneath the trees

was strewn with broken twigs and torn leaves and catkins that the birds had dropped in their orgie.

Of the Tits, the Blue was undoubtedly the most abundant, though the Great Tit was by no means rare. We saw Coal-Tits feeding young in three different places, but the bird was not common, and we did not meet with either the Marsh or the Long-tailed Tit. The Creeper has the reputation of being a shy singer, and when the trees are in leaf is easily overlooked ; but, from the number of times on which we heard the song in many different localities, the bird must be very plentiful. The Tree-Pipit, like the Redstart, was unaccountably rare ; we saw a pair in a wood at Holland Arms, heard three or four in song between Llanfair and Menai, and one at Llangoed, but none elsewhere. The Chaffinch and Greenfinch swarmed in the woods and in the cultivated district beyond ; the Bullfinch was fairly numerous, but we only met with the Goldfinch in one locality—near Menai Bridge, where a pair frequented an orchard. In this part of Anglesea the Jay and Magpie, if they occur at all, must be very rare, for we did not meet with either species.

The neighbourhood of the old Priory at Penmon, in the extreme east of the island, proved to be an exceedingly interesting district. Just behind the ruins of the Priory is a little dell, where many ancient ashes, alders, thorns, and elders, together with the Spanish chestnuts and walnuts in the Priory grounds, provide shelter for numerous birds. In the tree-tops was a small colony of Rooks, while the hollow limbs of the older trees were tenanted by Jackdaws and Tawny Owls. In mid-May the latter bird was much in evidence, enlivening the night with its musical call ; but during a second visit—in the first week of June—it was silent. We did not come across the Tawny Owl elsewhere, nor did we personally observe the Barn-Owl, but a quarryman at Penmon had a stuffed example which had been captured in a disused boiler a few months before. The Green Woodpecker, which we only met with sparingly in the larger woods, was astoundingly abundant in the neighbourhood of Penmon. The rotten timber of the old trees was riddled with nesting-holes, and even the smaller branches were pitted with the bird's borings. The Woodpeckers were not restricted to this isolated clump of trees where they nested ; we used frequently to

come across them on the bare bracken-covered limestone uplands which constitute the Deer Park, where they were no doubt feeding on the ants which swarmed beneath the stones. It was strange to continually hear the laughing cry of the bird in a district so dissimilar from the well-timbered park-land which we usually associate with the species in Cheshire.

The hollow trees in the dell provide accommodation for a large colony of Tree-Sparrows—a bird whose distribution in Wales is but little known. Many pairs, too, were nesting in the walnuts and ashes in the Priory grounds, and we noted a single isolated pair in a hedgerow sycamore near the schoolhouse at Penmon. On June 3rd and 4th we saw several birds carrying nesting materials into holes, presumably preparing for a second brood. House-Sparrows were often nesting in the same trees as the smaller species, and in two cases at least their untidy structures were visible in the loose foundations of nests in the rookery. The pushful Starling was, as might be expected, abundant. At Penmon birds were feeding young in the old Woodpeckers' holes; while in old walls, cottage roofs, the limestone cliffs, and trees in the woods, every likely hole was occupied by Starlings. During the first week in June numbers of birds were still busily feeding young in the nest, but many others had packed, and flocks of two to three hundred individuals were roosting in the old thorns in Penmon Park.

Several pairs of Spotted Flycatchers and Creepers were nesting in the dell, and Wood-Wrens, Whitethroats, Blackcaps, Willow-Wrens, and Bullfinches in the undergrowth. The Wren, of course, was common here; we found a nest in an unusual situation—suspended at the extremity of a drooping branch of elder, concealed by the surrounding leaves.

At midday on June 1st, when one of us was sitting beneath the trees, a male Siskin alighted in the lower branches of an ash, not fifteen paces away. Its forked tail, greenish plumage, grey-striped flanks, and black crown, forehead, and throat showed clearly in the strong sunlight. Subsequently we both searched for the bird on many occasions, but without success.

The stream that trickles through the dell is dammed, forming a little tree-sheltered pool, where a pair of Moorhens had a brood, and where at dusk the Pipistrelles hawked for flies,

replacing the Swallows and House-Martins that fed by day, as, above the trees, the Noctules replaced the Swifts. At this pool, one day, we watched a Robin take insects repeatedly from the surface of the water. In its flight from bough to bough it checked its course, hovering for an instant as it seized its food ; not taking its prey "in its stride," as a Swallow or Flycatcher does.

On June 3rd a pair of Creepers were feeding fully-fledged young (they left the nest on the following day) in a nest between the thick stem of an old ivy and the park-wall at Penmon. In nineteen minutes the parent birds made thirty visits, bringing green caterpillars and some black insects we could not identify from the neighbouring thorns.

Save for the trees near the Priory, and a few old gnarled thorns, the low limestone hills of the Penmon promontory are treeless ; several hundred acres are enclosed within high stone walls. The turf is cropped by innumerable Rabbits, whose burrows honeycomb the ground, providing nesting-holes for many Wheatears, and a few pairs of Stock-Doves and Sheld-Ducks. In the bracken, which covers many acres, a fair number of Nightjars crouched during the day ; and Lapwings, though common in the open country everywhere, were nowhere so abundant as here. There were several pairs of Meadow-Pipits near the Point, and along the cliffs from Penmon to Redwharf Bay ; but the bird is not generally distributed. The Sky-Lark, on the other hand, was common everywhere.

At the lowest part of the park is a shallow pool, which, sheltered by a high wall from the road that skirts the beach, affords a secluded retreat for Curlews and Ringed Plovers at high water. Indeed, one or two pairs of the latter bird had forsaken the adjacent shingle, and were nesting on the rush-grown turf by the pool-side. A male Sheld-Duck constantly frequented the water, where at times he was joined by his mate, who was brooding in a Rabbit-burrow on the limestone bank two hundred feet above, and a quarter of a mile inland. On the evening of June 5th, as we were walking across the high land in the Deer Park, we saw a small bird swimming on this pool. When we approached nearer we found that it was a Red-necked Phalarope, and though, in the pouring rain and fading light, it was impossible to dis-

tinguish its colours, its buoyant pose upon the water left no doubt in our minds of its identity. Early next morning we were at the pool, and found the little wanderer swimming within a few yards of the bank. Although we approached it quite openly, the bird made no effort to elude us; in fact, it hardly seemed to notice our presence. So lightly did the bird rest upon the water that it looked as if a breath of wind would pick it up and blow it away; yet, though it generally swam head to wind against a stiff breeze, it appeared to experience no inconvenience when swimming in the opposite direction. The bird was busily feeding—dipping its beak constantly in the water, and now and then uttering a soft “peep peep.” After we had watched the Phalarope for some time, as it swam with a zigzag course but a few feet from us, we threw a stone into the water near it, for we wished to see it on the wing. The bird rose, hovered for a second a few inches above the water, and then flew off over the grass, somewhat resembling a Ringed Plover in its flight, and distinctly showing its white wing-bars. It was back again in a minute, and recommenced feeding. During the day we visited the pool several times, but we never succeeded in inducing it to fly again; when disturbed by a splash it simply rose and hovered for a moment, dropping again a yard or so further on. At night-fall the bird was still there, but it had gone by the following morning.

It was an adult female; the rich fox-red of the neck contrasting sharply with the pure white chin and under parts and the dark grey of the upper breast. The clearly defined white spot immediately above the eye was distinctly noticeable at a distance of some yards.*

Between Penmon Point and Redwharf Bay the limestone cliffs rise to a considerable height, affording nesting ledges, in places, for many rock-haunting birds. At one spot there was a

* This spot appears to have escaped the notice of many ornithologists, whose descriptions have been compiled from the examination of dried skins. The spot is not shown in the figures of the bird in Dresser's ‘Birds of Europe,’ and Lilford's ‘Coloured Figures of the Birds of the British Islands,’ although it is undoubtedly present in the skins from which the figures were drawn. We have examined these skins in the Dresser Collection at Owens College, Manchester, and found that, owing to the contraction of the skin over the orbit, the spot is practically obliterated in dried specimens.

small colony of Guillemots and Razorbills, the species being in almost equal numbers; in another place a few Razorbills were breeding in horizontal fissures, but we failed to detect any Guillemots there. The Herring-Gull was the dominant Gull in this district; mature and immature birds were common in the Straits, where the only other member of the family that we observed was the Black-headed Gull. Some of the colonies of Herring-Gulls on the cliffs numbered hundreds of pairs, and in one place there was a fair admixture of Lesser Black-backed Gulls. We saw many Cormorants fishing in the Straits and on the inland lakes, and along the coast birds were constantly passing between their feeding-grounds and a precipitous cliff where a large number were nesting.

Of birds of prey, we noticed several nesting Kestrels, and one or two Merlin's; and at one spot a pair of Peregrines had their eyrie. Whenever we passed the place the falcon, and sometimes the tiercel, flew out, wheeling in circles above the sea, barking fiercely "hek hek hek." Again and again the falcon would stoop, as if in sport, at the Herring-Gulls which were passing along the cliff to their nesting-places, sweeping up again just before she reached them. The Gulls always swerved a little from their course when the falcon was all but on them, uttering a short single frightened scream. A Kestrel, on the other hand, which was nesting in a disused Carrion-Crow's nest, several times hovered over and stooped at the Peregrine, which merely swerved aside and made no attempt to retaliate. The Kestrel was not uncommon inland, but we only met with the Sparrow-Hawk once—at Gaerwen, where a male was gibbeted in a keeper's museum, along with a couple of Stoats and eighteen Weasels.

There were several large colonies of Jackdaws along these cliffs, and a few pairs of Carrion-Crows were scattered here and there. At one place we came upon a pair of Ravens in attendance on a brood of young which had not long left the nest. As at Penmon, the Meadow-Pipit was not uncommon, and the Rock-Pipit was feeding young in many places early in June. The tangle-covered *débris* at the foot of the cliffs provided a feeding-ground at low-water for many Oystercatchers and a few Sheld-Ducks. It was evident from their excited behaviour that some

of the Oystercatchers had young along the edge of the crags. On the sand at Redwharf Bay were a number of Sheld-Ducks, which were breeding in an adjacent warren; here, too, on the shingle were a few pairs of Ringed Plovers, a species which was nesting in several places on the low-lying coast between Penmon and Beaumaris.

At one place on the cliffs the Swift, which was distributed throughout the district, was nesting in some numbers; and at the same spot a colony of about thirty pairs of House-Martins had their nests on the precipitous limestone rock-face. The House-Martin, unlike the Swallow, was by no means common; indeed, we did not meet with any in that part of the district south-west of Menai Bridge. The Sand-Martin, too, was not plentiful, but a few pairs were nesting in the low marl-cliffs between Penmon and Beaumaris.

Half a mile north-east of Penmon Point lies Priestholm, or Puffin, an island, rising some two hundred feet above the sea, bounded by rugged limestone cliffs. "On this island," according to Willughby, "build the *Anates Arcticæ* of Clussius (here called Puffins), Razorbills, Guilliams, Cormorants, and divers sorts of Gulls." On June 6th we visited the island, where we found the "divers sorts" to be three species—Herring and Lesser Black-backed Gulls and Kittiwakes. Herring-Gulls, abundant on the cliffs of the mainland, swarmed here; the colonies practically extending round the island. Most of the birds were feeding downy young—some of them well-grown—but hundreds of nests still contained eggs. The clamour of thousands of voices, and the sight of the cloud of white birds above the blue water was most impressive. On the seaward or northern side of the island there were a few scattered pairs of Lesser Black-backed Gulls amongst the Herring-Gulls, but at the southern extremity they were massed in a large colony, and at this place far outnumbered the other species. Pennant was acquainted with the Lesser Black-backed Gull, for in his 'Zoologia Britannica' (4th edit. 1776–77) he accurately described the bird, which he met with in Anglesea, in his article on the Great Black-backed Gull, although he was undecided whether it was a distinct species or merely a variety of the larger bird. It does not appear, however, to be common during the breeding season in North Wales, and Mr.

O. V. Aplin, to whom we are indebted for calling our attention to Pennant's description, has not so far found it nesting on the coast of Lleyn.

The Kittiwakes were restricted to a short stretch of low precipitous cliffs on the northern side, where they had availed themselves of the slightest projections on which to place their apparently inadequate nests. In addition to the small colony on the island, a few pairs were nesting at one spot on the adjacent mainland. Though there were many Cormorants standing with outspread wings on the rocks, none appear to nest now on Puffin; nor did we see Shags here, or, indeed, in any other part of the district. Except on the seaward side, the cliffs are hardly steep enough for Guillemots or Razorbills, but a fair number of each were breeding in proximity to the Kittiwakes.

The thrift-covered turf slope above the cliffs on the western side is honeycombed with the burrows of Puffins, but the colony cannot compare in size with others which we have visited on the coast of Wales. The birds were brooding in their holes, and at every few steps, as we crossed the turf, one would bustle out, fly down the slope, just clear of the ground, and drop diagonally to the water. The Puffin appears to have formerly resorted to the island in much greater numbers, for Bingley ('A Tour through North Wales,' 1800) says:—"I had a sight of upwards of Fifty Acres of Land literally covered with Puffins, and my Calculation is much within Compass, when I declare that the Numbers here, must have been more than Fifty Thousand."

It is asserted that the Puffins were at one time almost, if not entirely, driven away by the Rats, which had taken refuge on the island from the wreck of a Prussian vessel in 1816 or 1817. Bell ('British Quadrupeds,' 2nd edit. p. 313), referring to this occurrence, says that not only were the Puffins evicted, but the vast numbers of Rabbits with which the island was stocked were destroyed by the Rats, which soon overran the place. The birds certainly do not now resort to the island in anything like the numbers mentioned by Bingley, and it is possible that they suffered from the increase of the Rats, but it is doubtful if they were ever entirely banished. The old sexton at Penmon assured us that, when he was a boy, his father used to visit the island in July for the purpose of collecting the nestling Puffins, of which

he used to gather as many as fifteen dozen in a morning. These were pickled, packed in small barrels, and sent into England, where they commanded a ready sale; but the practice had been discontinued for about sixty years. According to the old man's statement, it would appear that the young birds were taken regularly for at least twenty years after the wreck of what he called "the Rooshian barque," the particulars of which disaster had often been related to him by his parents.

The custom of farming the young Puffins is evidently an ancient one; it is alluded to by Edward Pugh (*"Cambria Descripta,"* 1816). In his description of Puffin Island, he says:—"I was a little surprised to find so desolate a place, extending three-fourths of a mile, and literally half covered with those indolent birds called puffins. . . . We walked to the extremity of the island, the boatman frequently shoving his arm up to the shoulder in the burrows, and bringing out the young puffins, to examine whether they were ripe, or fit to take." The island was "farmed" by the Bulkelys "to this man, and one or two others, who take the young birds when not yet able to fly, pickle, and put them in barrels of 12 inches long; then they are sold at about three or four shillings per barrel, sent to different parts of England, and are considered a great luxury."

A few demonstrative Oystercatchers, and a pair of Lapwings evidently had young on the island, and Rock-Pipits were nesting in several places on the cliffs. The Sheld-Duck is usually associated in one's mind with warrens, marshes, and coast sand-hills, and we were rather surprised to flush a party of sixteen adults from the top of the cliff, between 100 and 150 ft. above the sea, and to find at this spot that the birds were nesting. In one Rabbit-hole we found eight fresh eggs on a nest of light grey down, within arm's reach, and pieces of down at the mouths of other burrows showed that there were more nests in close proximity.

We saw a pair of Carrion-Crows, and on the Puffin ground a Lesser Black-backed Gull repeatedly swooped at a young Crow which cowered amongst the pink thrift. There is hardly any cover for hedge-building birds, but Blackbirds, Thrushes, and Hedge-Sparrows were feeding young in a small patch of brambles, stunted elders, and thorns on the lee-side

of the island. The other species we noticed—Starling, Wheatear, Sky-Lark, and Meadow-Pipit—were all abundant on the adjacent mainland.

Away from the coast, on the gorse-covered commons, and where the outcrops of metamorphic rock defy the efforts and primitive methods of the Anglesea agriculturist, the Linnet and Stonechat were dominant birds. On Mynydd Llwydiarth, a rough hilly country overlooking Redwharf Bay, we noticed one or two pairs of Whinchats, a species which we only saw in one other locality. Snipe were drumming on these hills, and we met with others near Llangoed. The Nightjar, which was also here, appears to be a common species in Anglesea.

Many of the small stony pasture-fields are bounded by low bramble-grown turf walls, which provide abundant cover for Whitethroats, Blackbirds, and Yellowhammers. Here the Corn-Bunting, perched on the highest spray, uttered his grating but not unpleasing song; this bird, however, was by no means generally distributed, being nothing like so plentiful as in the north and west of Anglesea. The Snow-Bunting is probably not infrequent on the coast in hard weather; we saw a bird at Penmon which had been killed against the telegraph-wires in January, 1902. Throughout the inland district, as well as on the coast, the Cuckoo was fairly plentiful. We may here mention that on Nov. 10th, 1899, a female Yellow-billed Cuckoo was found dead on the shores of the Menai Straits at Craig-y-don, near Garth Ferry, during a westerly gale (*Geo. Dickinson, 'Ibis,'* January, 1900, p. 219).

We saw a good number of Mistle-Thrushes in the fields and about the smaller plantations, and near Penmon we picked up the shrivelled bodies of two Redwings. The old thorns in the Park had probably proved an attraction to this species in the hard weather in the previous February. Although we kept a constant look-out, we failed to meet with the Yellow Wagtail. The Pied was not uncommon, and the Grey was nesting in two places; a pair were feeding their young in the bed of a stream at Plas Newydd Park-gates on May 21st, and we several times saw another pair in a little dell between Menai and Garth Ferry. The twitter and trill of the Redpoll in flight attracted our attention everywhere; the bird was exceedingly abundant, not only

in the wooded belt near the Straits, but along the hedges, and on gorse-covered hill-sides and commons.

Pheasants are hand-reared in many places, and the Partridge, owing to preservation, is not uncommon. The Landrail we found exceedingly abundant; in May and June birds were incessantly crackling in almost every field. Both Coots and Moorhens were nesting in some numbers in the llyns near Beaumaris, and the latter on brooks and small ponds in many places. The Coot was specially abundant on Llyn Bodgolched, a fair-sized pool, much choked with rushes and buckbean. Here were also a pair of Redshanks, several Mallards, and a few Reed-Buntings. The last-named bird appears to be very local in Eastern Anglesea.

The nature of the country in the southern part of the district is very different from the high land on the north-east coast. Here the Rivers Cefni and Braint enter Carnarvon Bay after they have flowed through low-lying marshy valleys separated by a low ridge of cultivated land which terminates in Newborough Warren, a great waste of sand-hills extending two miles back from the shore, and with a sea-frontage of nearly four miles. From just below Llangefni to Maldraeth Yard, a distance of some five miles, the Cefni flows between artificial banks which prevent the valley from being inundated by the tide. The reclaimed land is, however, in many places impassable swamp, while even the best pastures are thickly grown with rushes. The lush meadows are divided by deep muddy ditches, and in places by dense untrimmed whitethorn hedges, which, when we visited the marshes, were full of noisy Whitethroats.

On May 21st the hedgerows and the beds of rank herbage in swampy places were ringing with the songs of Sedge-Warblers. We had not noticed this bird in the wooded country between Beaumaris and Llanidan, and it was by no means common elsewhere. At noon, in bright sunshine, a Grasshopper-Warbler was reeling from the top of a low thorn-hedge; it allowed us to approach within a few yards, and we were able to see that during the snatches of song its widely gaping mandibles were never closed. When the bird flitted along the hedge its rounded tail was very noticeable. When we passed the spot some three hours later the bird was still singing. Like the Sedge-Warbler,

the Reed-Bunting, though rare elsewhere, swarmed in these marshes ; and here also we saw one or two Whinchats.

At one place on the marshes—near the site of some old colliery workings—are two or three fair-sized shallow pools, fringed with extensive beds of rushes and a few patches of reed. A Cormorant was fishing in the open water, a Heron in the shallows, and on an old spoil-bank, by the margin of the pools, a solitary Whimbrel was feeding. Swifts and Sand-Martins were hawking above the water, whose surface was dotted with Coots and Moorhens. Many of the Coots were attended by young, and one nest, in a patch of rushes, contained a young bird and some unhatched eggs. The little creature, which was actively scrambling about in the nest, constantly uttered a querulous wheezing pipe. Its whitish beak, brilliant scarlet forehead, shading into orange on the sides of the head, and vivid blue crown, together with its hairy black down, rendered it strikingly different from an adult bird. A female Mallard with downy young took refuge in the reeds as we approached, and a pair of Teal rose from the water ; on another pool we saw a second Teal drake. On the marsh contiguous to the pools about a hundred Mallards, mostly drakes, were resting ; some standing, others lying on the short turf. With them was a pair of Shovelers, the white on the neck and back and the chestnut breast of the drake making it conspicuous amongst the darker-plumaged Mallards. When the birds rose, the Shovelers flew apart, their low “tuk tuk” sounding very different from the noisy “quack” of the commoner species as they passed over.

Newborough Warren, a desolate waste of blown sand, whose unstable dunes are but partially held in place by the roots of maram-grass and dwarf willow-scrub, provides, in its innumerable Rabbit-burrows, nesting-holes for Wheatears, Stock-Doves, Starlings, and Sheld-Ducks. In the hollows between the dunes, where after heavy rain the water lodges and where butterwort and other marsh-plants abound, the Snipe and Lapwing were nesting. On the edge of the Warren, a little llyn, pink at one end with the flowers of buckbean, was inhabited by several pairs of Coots and Moorhens ; and on its sandy margin we saw a pair of Sandpipers. We only observed this bird elsewhere, on the Cefni, in Malldraeth Marsh, and on the shore of the Straits near

Menai Bridge. On May 19th, when we first visited this pool, we found the floating nest of a Dabchick moored in a bed of *Equisetum*; and, on removing the sodden covering of weed, we found five eggs, four belonging to the legitimate owner, and one being that of a Moorhen. The only other spot where we met with the Dabchick was on Llyn Llwydiarth, where we saw a pair on June 9th.

At dusk we heard the churring of the Nightjar in many parts of the sand-hills. In one place we saw a pair of Merlins which were evidently nesting; we were also shown eggs which had been taken from a nest in the maram-grass more than two miles from this spot. A colony of about forty pairs of Common Terns had their nests on the summits of the sand-hills near Aber Menai Point, and a few pairs of Lesser Terns had eggs in the shingle in the same locality, and on the sands of the Malldraeth Estuary. On June 12th, when we were near the colony of Common Terns, two Great Black-backed Gulls passed over; they were hotly pursued by the Terns, as were the Herring-Gulls which drifted by from time to time. When the big Gulls pitched on the sand we could see that one was an adult, and the other not fully mature, having the back lighter, and the tail tipped with black. On this day we found eggs of the Oystercatcher and Ringed Plover near Aber Menai. Both species were plentiful along the beach, the former often in flocks; the previous day we saw between fifty and sixty on the salttings near Malldraeth. Black-headed Gulls were abundant in the upper part of the estuary.

During May and June the majority of the Curlews are on their breeding-grounds, but we saw a few in the Straits, and on the Malldraeth Estuary. The Whimbrel, however, is more in evidence at this time; we saw the bird near Beaumaris, in the Straits below the Bridges, and in Malldraeth Estuary. On May 18th we watched a party of twelve at low water on the shore below Llanidan. Their characteristic cry, uttered especially on the wing, first drew our attention to the birds, which were feeding on the exposed banks, or wading belly-deep in the pools. In the strong sunlight the light stripe on the crown was very conspicuous when the birds lowered their heads to feed.

Malldraeth Estuary at low water is a broad expanse of sand, with many shallow lagoons, separated from the Warren by an

extensive salt-marsh, which is resorted to by large numbers of Sheld-Ducks. On May 19th, when walking along the shore, we saw several odd birds and pairs, and on reaching the salttings we were delighted to find no fewer than sixty-one Sheld-Ducks sitting or standing amongst the rushes. In striking contrast to a pair of yelping Redshanks, the Sheld-Ducks were surprisingly tame, often allowing us to approach within a few yards ; and even when they flew, they merely moved as far as a lagoon at the edge of the marsh, where they waded and fed in the shallow water. Near Malldraeth Yard, where the high road skirts a big tidal pool, the Sheld-Ducks, unlike the Herons which were feeding in the pool, paid but little attention to passers-by. Many domestic Ducks were feeding here, but the wild birds would allow no encroachment upon the spot where they happened to be feeding, driving the domestic birds away. The Sheld-Ducks often rose from the marsh in pairs, the duck, on the wing, being noticeably smaller than the drake.

When we visited the district later—on June 12th and 13th—we found about the same number of birds on the salttings ; and in several places on the sand-hills we saw the footprints of old and young leading down to the shore. Near Aber Menai Point we came suddenly on a pair with eight small young ones, which were paddling at the edge of the tide. Both old birds at once squattered along the water like a Mallard duck, while the young rushed into the waves, paddling out to sea in a different direction from that taken by their parents. The male desisted first from these alluring tactics, and presently both birds swam out and joined the young, which were by then some distance from the shore.

Other birds with young broods were swimming at sea, and on the marsh we came across a family which scuttled through the rushes before us. One of these which we captured—a bird about a third grown—was clothed in greyish-white down, with a broad brown band from the forehead to the tail, crossed on the shoulders by a band extending to the tips of the wings, and by another, in the pelvic region, which extended to the thighs. The bill was lead-blue, with a small whitish nail, and the legs and feet lead-blue, tinged with olive-green.

THE BIRDS OF SARK; AND VARIATION IN SONG.

By H. E. HOWARD.

I arrived at Sark on March 1st, having sailed across from Guernsey, a distance of about eight miles. Owing to the state of the tide and wind, the landing had to be made at the port of Havre Goslin, which landing-place consists of an iron ladder fixed on the cliffs, perpendicular for some distance, with a fairly steep climb at the end of it. The island is three and a half miles long by one and a half broad, and is encompassed with vertical cliffs two or three hundred feet high. Part of the land is cultivated, and part kept for grazing. The chief feature, however, is the number of valleys running down to the edge of the cliffs, valleys, which, for the most part, are covered with whins, and which account for the great number of stone-chats to be found there.

I was too early to see if the island was visited much by migrants, but I noticed one or two movements. On the 4th, flocks of Green Plover were passing the south end of the island, heading towards the east; the weather was fine at the time, with sea fogs in the morning. On the 11th, while walking near the cliffs facing south, I was attracted by a quiet note, very much like that of a Goldcrest, but sufficiently distinct to arrest attention. After waiting for a short time, the bird appeared out of a dense mass of bramble, and I had the pleasure of recognising a Fire-crest (*Regulus ignicapillus*). I watched this bird at different times for two days, often within a few feet—never more than twenty-five yards away. The plumage was beautiful, evidently full breeding, the golden hue on the nape and sides being especially bright. The weather had been fine and warm with sea fogs in the morning, and a slight wind from W.S.W. On the 12th, a single Wheatear appeared, and also on the same date I flushed a Woodcock amongst the gorse on the east cliffs. The number of Stonechats kept increasing daily; I noticed no old males among them. On the 12th, also, the Kittiwakes were

round their breeding haunts ; on the 13th, Razorbills appeared, and on the 17th Guillemots.

I was again struck by the excessive variation in the notes and songs of certain species as compared with my own county—Worcestershire. This variation I have previously alluded to in these pages. I thought, however, it would be as well to endeavour if possible to determine wherein the exact difference lay—whether in the pitch or arrangement of the song, or both. This was difficult, as to achieve such a result it was necessary to carry in one's mind the exact representation of the song as sung elsewhere. I found that the arrangement of the song—by arrangement I mean the order in which the various trills and single notes are placed, for it will be noticed that the song of most birds is composed of various little "snatches," each one of which practically constitutes a song in itself—differed to a great extent from the same song in Worcestershire, and when first heard appeared to differ *in toto*. I will take two examples, and by comparing the arrangement of the song of these two examples as sung in Worcestershire and Sark, will endeavour to point out the difference as it appeared to me. The two examples are the Great Tit and the Wren, and I take these because in them the variations were most striking, and, therefore, more easily defined.

The song of the Great Tit in Worcestershire consists, as a rule, of two notes, the one uttered last a full note higher than the first. In Sark it was very different, the first note often being uttered three, four, or more times, and the last note once; occasionally the first note was uttered alone, repeatedly, for some time.

The song of the Wren in Sark differed from other Wrens more than the preceding example differs from its respective species, and is more difficult to explain. The song is shorter, and certain parts usually found in the song of the Wren are altogether absent.

The whole subject of bird song is one of which we are profoundly ignorant. How few of those who profess to be ornithologists are able to distinguish different notes ! One would think that what is known as a "good ear" is a *sine qua non*, but this I cannot believe, having frequently noticed that those who

are musical are unable to distinguish different songs as readily as those who are not. I feel convinced that it is one of those things which is possible for anyone to learn with patience and close observation. We notice the same ignorance with regard to the appreciation of the beauty in the form of a bird. But can we wonder at this when even artists, whose powers one would think were altogether trained to appreciate that which is beautiful in form of every description, fail to appreciate that which is beautiful in a bird? That one has to be educated to beauty we know; but the same beauty of form, which for generations has been worshipped in the perfect human body, is to be found amongst all creatures in nature by those who seek for it. And yet I feel tempted to say that a naturalist without these two gifts—namely, the understanding of their language, and the appreciation of their form, which undoubtedly they understand amongst themselves as readily as their language—cannot be called a naturalist in the highest sense of the word. But I am digressing.

What are the causes of this variation of song? Is it due to some cause local or temporary, or does it depend on some general law which governs the whole animal kingdom? We naturally turn our thoughts to the human language and the human voice, and it appears to me that we have here somewhat of an analogous case. It is, I think, an admitted fact that dialect is due to climatic influence, and, again, that a damp or wet climate has the effect of relaxing the vocal chords, and thereby lowering the pitch. Does this apply to birds? Dialect perhaps expresses this variation better than arrangement. I noticed in Sark that the song and call notes of certain species were uniformly lower than in the county of Worcestershire. Among the most striking were the call notes of the Blackbird and Chaffinch, and the songs of the Great Tit and Wren. This phenomenon I had previously noticed in the west of Donegal, and having occasion to be there shortly afterwards, I made special observations on this point, and found the same thing in the Blackbird, Chaffinch, and Wren; and in addition amongst the following species: Corn-Bunting, Yellow Bunting, Sedge-Warbler, Whitethroat, Swallow, Blue Tit, and Coal-Tit. It has always been late in July when I have been there, otherwise I have no doubt I should have found it to be the general rule amongst many classes of birds.

I may here say that by the word "call notes," I refer to every note belonging to a species that is not actually the song, although they are not by any means in a number of cases call notes in a literal sense. The climate in Sark and in the west of Donegal are much the same. The rainfall of both is above the average; both are subject to bad sea fogs from the Atlantic, and are therefore very damp. On the other hand, the climate of Worcestershire is peculiarly dry, the rainfall being much below the average. Looking, then, at this fact, that a lower pitch corresponds with a damp climate, and a higher pitch with a dry climate, I think I am justified in coming to the conclusion that climate exercises a certain influence on the pitch of the notes and songs of certain species.

The dialectical variation is more difficult to explain, and my observations up to the present time are, comparatively speaking, so small, that perhaps I am hardly justified in forming any definite conclusion. The great difficulty in any researches on this point appears to be this—that all observations must be carried out by the same person; and to compare, except on general lines, with anyone making similar investigations is almost a practical impossibility. At first I was inclined to think that the song was more highly developed, or the reverse, in certain districts than in others, and that as a result of there being a scarcity of one sex or the other, sexual selection might exercise considerable influence in this direction; but on finding, after making further investigation, that migratory species were subject to this change, any theory with regard to sexual selection acting in this manner becomes impossible, and we must, therefore, look to some other cause for an explanation. I found that the song of the Whitethroat on the shores of Loch Lomond differed very much from anything I had previously or since heard. Again I noticed the same change in the call note of the Chaffinch in Inverness; and I now feel convinced that there are as many dialects amongst certain species as there are amongst human beings. I am inclined to think that the explanation will again be found in climatic influence, and that these dialects are in a great measure due to the lowering of the pitch. Take, for instance, the song of the Wren in a damp climate. When listened to very carefully, it will be found that the parts that

are absent, as compared with a dry climate, are those where the high notes are introduced. I do not mean that the song is not as beautiful; for I have listened to Wrens in Donegal singing quietly, whose notes, certainly not many, for fulness and richness of tone, were equal to the finest notes of the Blackcap. The same phenomenon applies to the song of the Whitethroat.

Different species appear to be subject to this climatic influence in different degrees of intensity. For instance, the variation to be found in the song of the Buntings is very small; I found great difficulty in detecting any variation at all in the song of the Yellow Bunting. The same thing applies to the song of the Tits, the Coal Tit having the least variation. On the other hand, the variation in the song of the Warblers—Wren and Blackbird—is most marked, that in the Whitethroat and Sedge-Warbler being very striking.

These facts seem to point to the variation being proportionate to the development that has taken place in the song of a given species, and I think it can be readily understood that the most highly developed, and, therefore, most sensitive, musical instrument would most probably be subject to this climatic influence in the greatest degree.

There is another phase of bird song which might be confused with this dialectical change, namely, the song of the immature males. The males of probably all species do not get their full song for some years, in the same way that they do not really get their full plumage—I think it very probable that the two correspond; but this song of the immature males differs rather in the direction of fulness and richness of tone than in any actual change of the song, and is very easily distinguished from this dialectical change.

My observations in a damp climate have always been made either in March or July. I think that a close study of the migratory species on their arrival in this country would, by settling certain difficulties, throw some light on the whole question. Is this change to be found immediately on their arrival, or does it increase as the season advances? Is it permanent, or only temporary? The difficulty, as I mentioned previously, is that it is impossible to compare notes with anyone making similar observations, and it is also obvious that it is

quite impossible, where so many dialects probably exist, and where so little is known about any one of them, to fix any standard. I would, therefore, suggest that comparisons should be made under as diverse conditions as possible—that is to say, between very wet and very dry districts, or between districts inland and districts on the coast. If it can be proved that this variation exists among certain migratory species immediately on arrival in this country, it will be necessary to follow them into their winter quarters. For, supposing a dialect is inherent in any one given species (which at first seems almost incredible), we should expect to see some signs of it in their said winter quarters. On the other hand, if we follow them and again find new dialects and new gradations of tone, or if we find on their arrival in this country that there is no immediate variation, but that it increases as the season advances, we shall have strong evidence that in some measure at least it is directly due to climatic influence.

I have shown that so many and such distinct variations do exist, and it seems only reasonable to expect that some of these variations, *amongst those species which are resident*, will become hereditarily attached to the male sex—for if they did not it would be subversive of the theory of sexual selection, a theory which must be admitted by all those who have studied certain species, in whom the vocal powers are excessively developed while courting—consequently species with a certain variety of song will exist in a small body and often breed together, and as a result the development from a dialect to specific song must in time ensue. It may be argued that it is impossible for a variety of song amongst individuals of any one species to have any connection with the origin of song in separate species; but I can see no more difficulty in believing, except to those, if there are any, who still look upon species as immutable, that through the vast ages that have lapsed, during which species have developed, a specific song may have become attached to a certain species through the action of sexual selection on varieties resulting from climatic influence, than I can in believing that species themselves have been evolved.

When we reflect on these variations of song, we can easily understand what mistakes have arisen, and probably will arise,

as a direct result of the same; on the one hand, species recorded erroneously in certain districts, on the other hand, species overlooked. The call notes and songs must always be the guiding factor to the ornithologist, as by them alone is it possible to recognize new species, and judge the movements of those that are well known. To those who are aware of these variations of song, and who are able to recognize them, there can be very little fear of mistakes; but to those naturalists who either cannot, or who have not taken the trouble to learn the notes of every species with which they have come into contact, the possibility of mistakes from the above cause must be very great.

The following is a list of all the species that came under my notice during the fortnight I was on the island:—

Turdus viscivorus, T. musicus, T. iliacus, T. pilaris, T. merula, Saxicola œnanthe, Pratincola rubicola, Erithacus rubecula, Regulus cristatus, R. ignicapillus, Accentor modularis, Parus major, P. cœruleus, Troglodytes parvulus, Motacilla lugubris, M. melanope, Anthus obscurus, Ligurinus chloris, Passer domesticus, Fringilla cœlebs, Acanthis cannabina, Emberiza miliaria, E. citrinella, E. cirlus, Sturnus vulgaris, Pyrrhocorax graculus, Pica rustica, Corvus monedula, C. corax, C. corone, Alauda arvensis, Alcedo ispida, Accipiter nisus, Falco tinnunculus, Phalacrocorax carbo, P. graculus, Sula bassana, Ardea cinerea, Querquedula crecca, Columba palumbus, Charadrius pluvialis, Vanellus vulgaris, Hæmatopus ostralegus, Scolopax rusticula, Larus argentatus, L. fuscus, Rissa tridactyla, Alca torda, Colymbus arcticus, Podicipes griseigena.

ORNITHOLOGICAL NOTES FROM THE WEST COAST OF SCOTLAND.

By W. H. WORKMAN, M.B.O.U.

FOR many years I have wished to visit the west coast of Scotland in the breeding season, and see the Gulls, &c., with their nests, eggs, and young. Most seasons we have been rather late, but this year we managed to leave Belfast Lough on the 18th of May; and were about the first sailing yacht to go north. It was very cold and wet, much more like the middle of winter than the beginning of summer. On the way up to Oban we had what might have been the bad luck to get drawn into the much-dreaded Gulf of Corrievrechan. It is rather a strange sensation to feel quite helpless, the rudder being useless, as there was no way on the 'Hotspur.' Sometimes we were swept so close to the rocks that one could have thrown a biscuit on shore, then round in a circle and out to the centre, where there is a short, rather heavy swell; but, owing to the calm weather, we had no trouble, and after about an hour we got shot out at the west side. There were a great many Guillemots, Herring and Lesser Black-backed Gulls fishing in the tideway. We have always noticed this in strong tides; the fry must be brought to the surface by the rush of water. At Lismore there are always large flocks of Terns feeding. Our first anchorage was Loch Spelve, in Mull, which we reached on the 23rd. We here found the nests of two Sandpipers (*Totanus hypoleucus*), situate rather high up on banks, and made of moss, ferns, and grass; each nest contained four eggs. We also noticed large numbers of Lapwings (*Vanellus vulgaris*).

On the 26th we landed on a small island in the eastern end of the Sound of Mull, where we found a great number of nests of Lesser Black-backed Gulls (*Larus fuscus*); all contained eggs, it being rather early for young birds. The nests were very roughly made of grass, situate among bracken and long coarse grass. A Duck's nest was also found. We rounded Ardnamurchan without

feeling those—to put it mildly—quieting effects of open water. I was on the look-out for Richardson's Skua (*Stercorarius crepidatus*), for I had seen one off this point in 1900 ; but this year I was not so fortunate. We anchored on the 30th in the lee of the island in Loch Airlort. Shortly after we let go, I noticed some Sheld-Ducks (*Tadorna cornuta*) flying about, and looking beautiful in the sunlight. On the island we found nests of Herring-Gulls (*Larus argentatus*), which are much neater than those of the Lesser Black-backed Gull. The eggs are about half an inch longer, and much more handsomely marked. On this island there is a very good example of a vitrified fort, showing clearly the bubbles of molten stone.

We reached Glenelg on the 31st, and while walking close to the stony beach came on some Ringed Plover (*Ægialitis hiaticula*) running to and fro, and calling to each other. We watched them for a long time with glasses, and then approached them to see if they had a nest ; they came quite close, getting very excited. Suddenly we heard something squeaking close beside us, and we looked about for some time, but could see nothing. At last I noticed a little ball of down among the stones ; it was grey on the back, with white tips to the wings, white under parts, and a black strip from the beak to the back of the head. So like was this young Ringed Plover to the stones amongst which it was standing, that whenever I took my eyes off, it was quite difficult to pick up again, although I knew the spot where it ought to be. All the time the old birds were running about whistling, and occasionally one of them would fall over on its breast, spread out the tail, extend the wings, and flap about like a wounded bird ; then stretch its wings straight up, as if in the last agonies of death. It would let me approach within three or four yards, then get up and fly away to some other part of the beach. We found some more birds of this species at Gairloch.

On the 4th of June we landed on the Ascrib Islands, west coast of Skye ; they were almost covered with Puffins (*Fratercula arctica*), especially round their breeding-places. We walked to the edge of the small cliffs, and found the earth on the top riddled with burrows. Some we opened up were about two or three feet long, with a little heap of grass at the end ; on this is laid the one white egg, which soon gets very dirty. The earth-

road up to the nest is kept damp by the wet breast and feet of the bird as it comes from feeding ; this earthy paste is carried to the egg, which soon gets a warm brown colour. These birds were very tame, and I got within a few feet of them. Two of our party caught one as it came out of its burrow ; they were very sorry afterwards when they found they had caught more than the Puffin. In a small marsh one of the party found the nests of two Eider Ducks (*Somateria mollissima*). One of the birds flew off on approach.

We left Oban on the 11th to again sail north. As we were going through the Sound of Mull we lowered the dingy, and pulled over to an island, where we found nests of a large number of Terns (*Sterna fluvialis*), and I think the Arctic Tern (*S. macrura*) was also present. The eggs were very plainly marked, and there was no attempt at building a nest.

On the 13th we dropped anchor in Knoydart Bay, Loch Nevis, where we found another Sandpiper's nest with four eggs ; a little farther on we came to an old Sandpiper with four young ones, which were very hard to distinguish from the ground, being a warm grey on the back, with black stripes ; they had long legs, and could run fairly fast, although they must only have been a few days old. A winged Sandpiper will dive and swim like a Duck ; so will a wounded Oystercatcher (*Hæmatopus ostralegus*). We saw a Goosander (*Mergus merganser*) swimming about in the bay ; it was easily recognized with the glasses, as it came close to the shore.

Balmacarra was our next stopping-place. When passing the keeper's cottage I noticed four large Wild Cats' skins nailed on the kennels, and I immediately went in search of their owner, as I thought there might be a tale connected with them. The keeper told me he trapped seven in 1900, two in 1901, and four this season, but it seems a pity to exterminate such a rare and fast decreasing mammal. As we were talking a large bird flew over some trees ; he told me it was a Buzzard (*Buteo vulgaris*), and that these birds breed every year on this estate, along with Merlins (*Falco æsalon*) and other Hawks ; but I am sorry to say their nests are destroyed every year. At Gairloch, on the 18th, I had a talk with the keeper of the Flowerdale Estate. He told me that they had Golden Eagles (*Aquila chrysaëtus*), Peregrines (*Falco pere-*

grinus), and Merlins. I am glad to be able to say that the owner does not have them exterminated altogether.

From Gairloch we had a long sail to Loch Inver, which we reached on the 19th in a strong breeze of wind. As we passed one of the islands at the mouth of the loch, half a dozen Wild Geese flew close across the bows. I think they were *Bernicla leucopsis*; at least they were very like a stuffed specimen of this species I had seen in the possession of Mr. Sheal, the taxidermist, at Belfast.

At Loch Broom, which was our next anchorage, I paid a visit to the excise officer, who is somewhat of a naturalist. He showed me some rather interesting birds—a young Sea-Eagle, shot near Loch Broom; a Shearwater, but of what species I am not certain; a Storm-Petrel and egg; also eggs of Black- and Red-throated Diver. He also showed me a Pine Marten, shot near Ullapool, which I believe is another of our fast-disappearing mammals.

On the 25th we lay close to Piper Island, Loch Hourn. We landed, and found a large number of Terns' nests, which were rather different from those in the Sound of Mull, and, being on the rocks, were made, or rather banked up, with stoncrop and seaweed. The eggs were very handsome, being yellowish with large sepia blotches, but perhaps these were eggs of the Arctic Tern. When walking round the shore we found an Oystercatcher's nest with three beautifully marked eggs; it was placed under heather, and made of grass. The usual place is a depression in the shingle a little above high-water mark; at least, that is where I found one near Fort William some years ago. At the mouth of this loch there is a fine cliff called Priest's Rock, where, in 1900, I had the pleasure of seeing a pair of Peregrines flying round and round, uttering their wild screams. This year we sailed close under, and fired a gun, but saw no sign of them. Perhaps they had been shot.

Canna, which we reached the next day, is a most interesting island, being one of the most fertile and prosperous on the west coast. In the evening we landed for a climb to the high part of the island, where the cliffs are sheer down for 700 ft. When we reached the moor on the top of the hill, I noticed some birds running about and whistling to each other. In a few seconds I

had them in focus, and saw they were Golden Plover (*Charadrius pluvialis*) in breeding plumage, which interested me greatly, as it was the first of this species I had seen alive. They went about in pairs, sometimes coming quite close ; I think they had young among the grass and heather. We next went to the edge of the cliffs to see the thousands of Puffins that are continually flying backward and forward. It is wonderful looking down from this great height at the never-ceasing stream of bird-life, all seeming to be in a great hurry about something. As we were leaving the northern cliffs I noticed an Eagle circling at a great height above the water ; it settled on a rock on the edge of the cliff, and I had a good look at it with the glasses. From the description in Saunders' 'Manual,' and from the stuffed bird I saw at Loch Broom, I think it was a young White-tailed Eagle (*Haliaëtus albicilla*). I think there is nothing that gives more pleasure than to look on a species that one has often read about, but has never seen alive in the wild state. I had this pleasure a few times this year, but what must it be to discover a species new to science ! The Great Black-backed Gulls also come to Canna, and Mr. Thom, the owner of the island, tells me they sometimes attack the lambs, pecking out their eyes, and gouging into the brain. One he knew, which was kept in captivity, swallowed three Starlings, feathers and all, one after the other. I saw a pair of Peregrines in 1900, and I hear they still live unmolested in one of the cliffs.

One day I was talking to our skipper about Gannets (*Sula bassana*). He told me that one year, off the Isle of Man, he caught them in herring-nets twelve fathoms down—seventy-two feet is a big dive for a bird—and at Loch Strivin he has often obtained Guillemots (*Uria troile*) in the cod-nets thirty fathoms down.

I hope my few notes may be of some interest to ornithologists who intend spending their holidays in what I think is the most beautiful part of the British Isles.

NOTES ON THE LESSER WHITE-BACKED MAGPIE (*GYMNORHINA HYPERLEUCA*) IN TASMANIA

BY FRANK M. LITTLER, M.A.O.U.

To the majority of people in Tasmania this bird is simply known under the name of "Magpie." In the districts it frequents it is the best known of birds after the ubiquitous House Sparrow (*Passer domesticus*). It is restricted to certain parts of the island; on the colder and wetter parts of the west coast it is a complete stranger; some efforts, however, have been made to introduce the bird there.

Our Magpie is peculiar to Tasmania, not even being found on any of the islands in Bass Strait. On the mainland of Australia its nearest relation is the Black-backed Magpie (*Gymnorhina tibicen*), which has a fairly extensive range, and is the larger bird of the two. There is some slight difference in the colouring of the sexes. In the male the whole of the under surface, head, and cheeks are a beautiful glossy black; the rest of the plumage is white; bill, horn-colour; legs and feet black.

The male bird is a really handsome fellow in the nesting season. He is often to be seen perched on a rail with beak uplifted and chest swelled to the fullest, pouring forth his joyous and melodious song to his mate, who is busy hunting for grubs on the ground close by. How bright and intelligent his eyes are, full of worldly wisdom and cunning, well suited to help their possessor on life's rough path. To the casual observer the most conspicuous difference in the plumage of the female is that the under surface is more of a grey than a black, and the upper surface is very dingy compared with that of the male.

The nest is open and bowl-shaped; sticks and twigs and some strips of eucalypt bark constitute the main items in its composition; the inside lining consists principally of grass stems and shredded bark. The situation usually chosen is in the forked branches of an eucalypt, generally some distance from the ground.

Although the same nest is not occupied during successive years, the same tree is resorted to season after season. Furthermore, a keen observer has given me as his opinion, that should one of a pair nesting in a tree to which they had become attached be killed between nesting seasons, the survivor brings along another mate to the old nesting tree. In exposed positions it is not often that such a frail nest, as it really is, holds together from one season to another. All Magpies have not built their homes of such prosaic materials as twigs and bark. Occasionally some daring spirit is to be found who, ignoring "Mrs. Grundy," has launched out on a plan of its own, much to the scandal of its everything-by-rule-of-thumb neighbours. In well-tilled districts wood becomes very scarce, only isolated giant gums being left here and there. Magpies were in a quandary, not enough suitable building material being easily available for house building, and the problem was thus solved :—The first reapers and binders introduced into Tasmania were the "Walter A. Wood," binding with wire. When the stacks were thrashed the wire on each sheaf was cut and thrown in a heap. With this unpromising material some of the Magpies, in the Longford district more particularly, built their nests. String binders superseded wire, and the Magpies that used wire had to go back to the traditions of their forefathers and employ sticks.

Three and sometimes four eggs are laid. In shape they are oval; the ground colour is light greenish, spotted and blotched all over with amber. Dimensions are about $1\frac{1}{2}$ in. by 1 in. To Tasmania belongs the privilege of being the first State to recognize the Magpie as being of economic value, and to extend protection to it as such. In 1879, under the Game Protection Act, 42 Vic., No. 24, it was decreed that whosoever killed the birds or destroyed their eggs would be liable to a penalty not exceeding £1. In 1885, this Act was extended under 48 Vic., No. 35, so that persons could not buy, sell, or offer for sale birds of this species. Notwithstanding that this Act is still in force, large numbers of young birds are taken annually from their nests and sold as pets to dwellers in the towns.

Some time since, while on a visit to a district in the northern part of the island, I was struck by the total absence of the Magpie. On asking if there was any known reason for it, I was

informed that the farmers had destroyed them all, as they considered that they (the birds) pulled up the wheat when in the "milk." I endeavoured to point out what a grave mistake had been made. It was another instance of too hasty conclusions being arrived at through faulty observation. The birds were merely searching among the sprouting grain for their favourite food of grubs and worms. A lamentable number of Magpies are destroyed every year through the careless and indiscriminate laying of poison for rabbits and sparrows. There is a certain number of agriculturists who cannot, and will not, see any good in birds, and consider that even the total annihilation of their feathered friends would have no effect on the many "pests" with which they are plagued. Not long ago a large landowner, who does not poison, picked up no fewer than 200 dead Magpies, besides other birds, that had been poisoned by his neighbours.

The food is almost entirely insectivorous; in the winter seeds and any stray grain are added to the *menu*. The larvae of the Hepialid moth *Oncopera intricata* form its favourite diet, and about sunrise is the chief feeding time. It is very entertaining to watch a Magpie hunting for grubs; it goes about the work in such a business-like manner.

Let us watch one at work. It soon stops short and puts its head on one side, as if saying, "Now I have got you." An instant later the beak is darted down with lightning rapidity and a grub pulled out. It must not be imagined that the grubs are lying full length out of their burrows; their heads only are visible just below the surface of the ground, but quite enough for the sharp-eyed Magpie. When not engaged in seeking food, most of its time is passed among the branches of lofty trees. It moves in small flocks of from six to a dozen individuals, although occasionally far larger flocks may be seen. The largest flock I have seen recently round Launceston consisted of forty-seven birds. Round Conara (the native name for the Magpie), and other midland districts, even larger flocks may be seen.

The Magpie is of a somewhat pugnacious disposition, being always quite willing to cross swords with one of its own species or any other bird, or, if tame, does not scruple to try conclusions with a cat or dog. Hawks are its pet aversion, not an opportunity being lost to harass every one that comes near. On one

occasion a Sparrow-Hawk (*Accipiter cirrhocephalus*) was too clever for its tormentors. Some half dozen Magpies were chasing a Hawk away from a tree which contained a nest and young birds, when suddenly the Hawk doubled and, darting straight for the tree, plucked a young bird from out the nest and sailed triumphantly away. Near a certain farm in the country stands a giant eucalypt, in which a pair of Magpies nest year after year. When there are young in the nest the old birds are very savage, darting down with angry cries on every one passing under the tree.

A Magpie makes a most entertaining and useful pet, though after a time it becomes very mischievous, and delights in pulling up freshly-set plants. I have known one, after watching, say, turnips or onions being thinned out, to go on with the thinning until not a plant remained.

Another bird used to watch the operation of setting young plants very intently, and as soon as one's back was turned commence pulling them all up. As a counterpoise against these bad traits, there is the good one of being a very useful destroyer of insects of all kinds. This bird is one of our best songsters, its voice being very powerful and pleasing. Early on a summer's morning nothing is more delightful than to hear a number of Magpies pouring forth their melodious song while swaying on the top-most twigs of some lofty tree. Morning and evening are the times when most singing is done. It is no uncommon thing to hear them burst into song in the middle of some bright moonlight night, and after having successfully routed a Hawk is another occasion for a triumphal song. The wing-power of this species is very great; it can dash through space with a marvellous rapidity. Long distances (comparatively speaking) are traversed without a perceptible movement of the outstretched wings.

Launceston, Tasmania.

NOTES AND QUERIES.

MAMMALIA.

Some Habits of South African Hares.—It seems to me that the habits of South African examples of the *Leporidae* are little known. Although I do not know any special facts *re* the breeding habits of the South African Hares, a few notes derived from my sporting experiences may be welcome.

With regard to *Lepus capensis* (the common "Vlakhaas," *i. e.* Flats' Hare), Mr. W. L. Sclater, in his very valuable 'Handbook on South African Mammals,' says:—"This Hare frequents uncultivated land and flats covered with scattered bush; it may often be seen at early dawn and in the evening feeding on the grassy spots along the roads. When pursued it will take refuge in the ground, if it is able to do so, though it does not form a burrow of its own"; . . . remarks with which I concur. In addition to these localities, I have seen and shot this Hare among the thick eucalyptus and fir-plantations on the Rand.* When chased by Dogs they make off at first with the ears erect, giving curious little skips and hops; but as soon as they feel that the chase is going to be a serious one, they lay the ears flat along the sides of the head and neck, and run steadily; they dodge and double splendidly, and through this, coupled with their speed, afford good sport. The running powers of the Hare is often underrated; my own experience is that they afford good sport, although no doubt their speed is not on a par with that of European Hares, and even here varies individually, as with Horses and other animals. I have had runs of a distance varying from half a mile to three miles and more with a pack of four pure bred greyhounds and several half-bred animals. Times without number I have lost the quarry through its taking to the earth in an Ant-bear ("Aard-vark") or Meerkat hole. This Hare makes delicious eating, notwithstanding the statement so often made that it is a foul feeder. This it may be at times, but I have not seen it yet myself.

* Was common at and near Pretoria before the war, and generally to be found at the back of the town, in a small stretch of thorn and other trees near the then Boer Artillery Camp. It was there I shot my last Hare in the Transvaal.—ED.

This species usually sleeps in holes or lairs in grass-tufts on the veld. Their usual feeding-time is early morning and in the evening.

Lepus saxicola (vernacular name, "Kol-haas"; literally, "Spot-hare").—The running powers of this Hare are considerably greater than those of the preceding species. I have generally found them among scrub, rocks, and stones on koppies, and in plantations. They go out into the flats to feed, but are never found very far from bush or koppies (*i. e.* cover of some sort), according to my coursing experiences. You will very often see them of an evening skipping about the paths and feeding along roadways, or just outside plantations. Their forms are usually under scrubby bushes, or underneath overhanging stones or rocks. These Hares are very common in the eucalyptus plantations of the Witwatersrand, and form the chief bag of a day's drive.

Lepus crassicaudatus ("Rooi-haas").—This Hare is a denizen of rocky declivities and krantzes on koppies. I have seen a few on Botha's Berg, near Brandford, Orange River Colony, and a couple along the ridge near "Orange Grove," Johannesburg; also at the Klip-riversberg. They are shy and retiring, and consequently I have had no chance of making any sporting acquaintance with them. Their bushy and reddish tails are quite enough to distinguish them from the two foregoing species.—ALWIN C. HAAGNER (Johannesburg).

A V E S.

Lesser Grey Shrike in Norfolk.—While Partridge driving at Docking, in Norfolk, on Oct. 11th of this year, I shot a Grey Shrike, which turned out to be the Lesser Grey Shrike (*Lanius minor*). The bird is evidently a young one, as it has traces of buff tips to the wing-coverts, where the edges are not worn away. I was unable to set it, as it was very high when I skinned it, and was rather heavily shot internally with No. 5. There is no trace of rose colour on the breast, but the sides of upper part of breast are inclined to a pale buff colour, with faint barred markings; no black on forehead, but a broad black streak on cheek and ear-coverts; scapulars grey, with no approach to white; outside tail-feathers white, even to the shafts; first primary very short, not equalling in length the primary coverts. I exhibited this bird at the last meeting of the British Ornithologists' Club.—G. E. LODGE (5, Thurloe Studios, Thurloe Square, S.W.).

Red-backed Shrike in Anglesea.—On June 19th I saw a pair of this species (*Lanius collurio*), and found the nest with newly-hatched young in a thick bramble-clump a little inland near Carmel Head. Though the locality where these birds had taken up their abode was a

likely one, yet the general character of this part of the island is very bleak, bare, and treeless, and unsuited to the habits of this bird. I again came across a male of this species on June 24th near Point Lynus. I am of course open to correction, but, so far as I can gather, there is no previous record of this bird in Anglesea. Last year I also met with a pair and young near Edeyrn, in Lleyn. — S. G. CUMMINGS (King's Buildings, Chester).

Migration of Jays.—It seems to be an established fact that *Garrulus glandarius* does migrate occasionally, if not regularly. It is possible that our home-bred birds are augmented in numbers every autumn by arrivals from the Continent, but sometimes to a much greater extent than at others. Some twenty years ago (Zool. 1883) a marked migration was recorded from various localities—from Heligoland westward to our east coast, and thence inland as far as Hampshire and East Dorset, and possibly much farther west—but I have no personal records of their journey. It is interesting to state that since the beginning of October there has been an unusual number of the birds both in the forest and in the woods to the west of the Avon, far more than were bred in either locality, and of course the “gamekeeper’s museum” has been enriched in consequence, one brave fellow boasting that he had killed more Jays in one day (about the middle of October) than he had seen for a couple of years previously. It must be understood that a relentless war has been waged for years past against this beautiful but noisy species, and that in this locality it is much scarcer than it was formerly; but during the past few weeks many people not generally interested in birds have informed me of seeing Jays in most of the woods. It is well known what an omnivorous appetite these birds have, and very little is rejected—young birds or eggs, insects in either stage, fruit, oak-galls, and grain, are all alike devoured; but in my younger days there was an oak-wood in this neighbourhood where I could always find Jays, and where their nests were not uncommon, and it always seemed to me they were fonder of acorns, when they were to be had, than of any other food; but any “hard and fast” rule with regard to the food of birds may be easily broken, as the following fact will prove. We are all well aware how much a Peregrine Falcon prefers a Wood-Pigeon to most other forest birds, and what an exhibition of wing-power is displayed in the dash of pursuer and pursued; but since the Jays first began to appear, a Falcon—or rather two Falcons—were reported to be preying upon them, not because Wood-Pigeons were scarce; and, on making further enquiries, I find the report correct. As a proof, a gamekeeper had seen a Falcon strike down a Jay; he

baited a trap with the quarry, and the next morning the Hawk was found in the trap. It was one of the finest female Peregrine Falcons that I have seen.—G. B. CORBIN (Ringwood).

Hoopoe near Wick.—An adult male Hoopoe (*Upupa epops*) was shot on the moor near Wick last August, and is now in my collection. GEO. DICKINSON (23, Abercromby Square, Liverpool).

The Long-eared Owl (Asio otus).—Has it been observed that this handsome species of Owl was commoner than usual during the past summer? In the valley of the Avon it seems to have bred in some numbers, as I saw them in all stages of growth, and especially in the latter half of June and through July, when the majority were almost fully feathered, but the "horns" not entirely developed. In this stage the thing that struck me most was the beautifully varied tints of plumage, especially about the facial disk; no two seemed exactly alike, and one presented a particularly grotesque appearance—around the eyes and underneath the beak was almost entirely black, whilst the margins of the disk seemed whiter than usual, which "threw up" the inky black tips in a remarkable manner. A large number of these Owls must have been killed, as the gamekeeping community aver they come to the coops and carry off their young birds, and no amount of reasoning will convince them that mice and their kin more than young Pheasants are sought after by the Owls. The coops are usually closed when the soft-plumaged, silent Owl is on the wing, and the marauding rodents, in their nocturnal rambles, come for the scattered grain or other food, or even to purloin a chick; but because the Owl is seen in the vicinity he is ruthlessly slaughtered, when in fact he is more guardian than culprit.—G. B. CORBIN (Ringwood).

Plumage of Montagu's Harrier.—I should be greatly obliged if anyone having a sexed example of the *young female* Montagu's Harrier (*Circus cineraceus*) would tell me if it is marked on the under parts with longitudinal markings or streaks. Yarrell says that young females have the under parts unmarked (like young males); but it seems to me curious that the young birds should be unmarked on the under parts in all cases while the adults are strongly (and heavily in some cases) marked. The tendency in birds of prey is for markings on the under parts to become small, or to disappear, with increasing age of the individual. In the volume for 1901 (p. 476) I recorded the occurrence of a young Montagu's Harrier (not sexed, but believed by me to be a female) in Northamptonshire. In identifying this specimen as Montagu's Harrier, I relied on the shape of the fifth primary (*vide* Mr. Howard

Saunders's 'Manual'), although (as the bird is stuffed) the wings look very short for this species. This example has the under parts well marked with longitudinal streaks, and it has been suggested to me that for this reason it cannot be Montagu's Harrier, and that I identified it wrongly. I should be very glad to hear from anyone who has sexed examples of young Montagu's Harriers.—O. V. APLIN (Bloxham, Oxon).

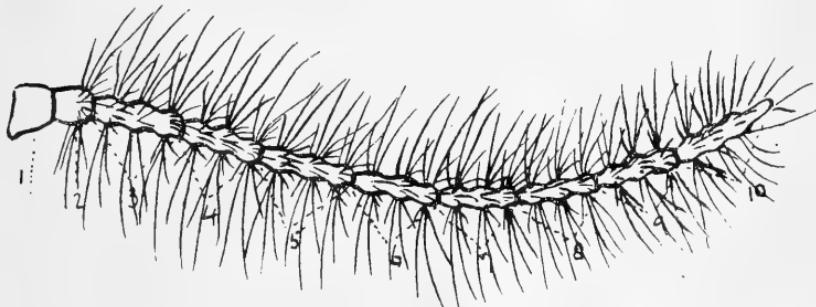
Moorhens feeding Young.—On July 13th I watched a pair of Moorhens (*Gallinula chloropus*) swimming about in a small pond with their brood of six newly-hatched young ones—tiny balls of black fluff with red bills. Both the old birds were feeding the youngsters with insects taken from the surface of the water, and, as far as I could see, with small pieces of water-weed; also on one occasion with a morsel off a lump of bread which was floating on the water. Swimming in the same pond were three full-grown young birds of the year (in the grey-brown plumage, with green bill and legs), presumably the first brood of the old pair, and I was interested to observe that these fed the newly-hatched young ones with as great assiduity as did the old birds, and that the young ones followed them about quite as much as they did their parents. I see that this habit, which was new to me, is not unknown, for Mr. Howard Saunders, in his 'Manual' (p. 518), says:—"Two, if not three, broods are produced in the season, the young from the first nest assisting their parents in building another, and even in taking care of the second brood." The method of feeding struck me as peculiar. The old bird, on catching an insect, swam up, and presented it to the youngster, who picked it out of his (or her) bill. Never once did the old bird place it in the young one's mouth, as is usually the case in birds which feed their young, nor the young one open its bill to receive it.—BERNARD B. RIVIERE ("Flaxley," 82, Finchley Road, N.W.).

Ornithological Incidents at Petersfield.—Noteworthy incidents have been singularly scarce in this locality during the present year. I have only to record an instance of two Cuckoo's eggs in the nest of a Hedge-Sparrow containing two eggs of the rightful owner. This occurred early in June in a hedge by the roadside near Theale, Berkshire. A little later in the month two more Cuckoo's eggs were found in a Hedge-Sparrow's nest, close to the site of the first nest.—H. MARMADUKE LANGDALE (The Vicarage, Compton, Petersfield).

I N S E C T A.

Morphological Interpretation.—Dear Mr. Distant,—In the introduction to your first volume on the 'Rhynchota of British India' (p. xxx) you say:—"In some Reduviids the antennæ are apparently

8-jointed, the maximum number of about twenty-five being attained in the males of some Coccidæ." I have seen this statement repeated in various entomological works, but I believe it to be quite erroneous, and founded upon the fact that in many male Monophlebids the joints are 3-nodose, each node giving rise to a prominent whorl of hairs. Ten is the normal number of joints in the males of the Coccidæ. I know of no species in which this number is exceeded. I give a sketch below of the antenna of a male *Monophlebus*, which will show you how the misconception has arisen.—E. ERNEST GREEN (Royal Botanic Garden, Peradeniya, Ceylon).



[Mr. Green appears to be quite correct in his contention on this point, as may be seen from the above figure, and from microscopical examination made since the receipt of his letter. I had unquestionably followed the opinions of very high authorities. Latreille ('Le Règne Animal,' tome v. p. 232 (1829)), who appears to have been the first to give a diagnosis of the genus, which he writes "*Monophleba*," refers to a species from Java, "remarquable par ses antennes, composées d'environ vingt-deux articles." Burmeister ('Handbuch der Entomologie,' ii. p. 80 (1835)) describes the males of *Monophlebus* as having up to twenty-five joints. Westwood, who paid much attention to the genus ('Vigors' Zool. Journ.' v. p. 452 (1835)), describes the antennæ of the male of one species as "26 articulatae." Recently Dr. Sharp ('Cambridge Nat. Hist.' vol. vi. p. 539 (1899)) has described the maximum number of antennal joints in some males as about twenty-five. The issue rests on the method of morphological interpretation, and Mr. Green has done a very useful service.—ED.]

A Remarkable West African Leaf-Gall.—The gall illustrated in the accompanying photograph is very noticeable, owing to its resemblance to an inflorescence. It is common enough in this locality, and I have met with more than a dozen specimens of it. It is always found on the same plant (apparently a species of *Ficus*), and I have only seen

one specimen of the plant not infested by the gall-fly. The part attacked seems to be always the base of the leaf, or possibly an unopened leaf-bud. The gall-capsules at first are pale yellowish green, with irregular reddish staining. As they mature they become dark green, and are aggregated together into a dense mass, through which the leaves continue to grow, but in a stunted and irregular manner;



in some instances abortive leaves or bracts occur between the individual capsules. When the capsules are mature they burst and expand like the corolla of a flower, eventually showing a bright apricot-coloured interior of velvety texture, and the whole has quite the appearance of a brilliant inflorescence. The colour of the interior of the capsules deepens from primrose-yellow, on first opening, through nankeen-yellow, to a deep apricot, and then fades to brown and black as the mass withers. The mature capsules seem usually to contain one insect and one cast skin each, but sometimes two capsules coalesce internally before bursting, and in one such combined capsule I found two insects and three cast skins. -- W. HENRY HILLYER (Princisu, Wassau District, Gold Coast Colony, West Africa. Lat. $5^{\circ}54' 57''$ N.; long. $2^{\circ}40'$ W.).

[This insect was described by Walker in 1851, from specimens received from Sierra Leone, under the name of *Psylla? lata*. The genus in which it should be placed is certainly not *Psylla*, but that question need not be discussed here. Réaumur, in 1737 ('Mémoires,' t. iii. mém. x. pl. xxix. figs. 17-24), has detailed the history of a species (*Anisotropha ficus*) which lives on the fig. Recently Mr. C. P. Lounsbury, the Government Entomologist of Cape Colony, has described the ravages of the Citrus Psylla (*Trioza* sp.), which attacks any kind

of citrus trees, and causes a great distortion of foliage (Cape of Good Hope, Department of Agriculture, Reprint No. 21, 1898).—ED.]

“**Making the best of Difficulties.**”—With regard to the communication on this subject (*ante*, p. 392), my own experience may be of interest. I have had many larvæ of *Dicranura vinula* at various times, and have always found that they can be persuaded to manufacture their cocoons out of any material which is given to them, in default of the natural supply. If one of these larvæ be put in a tin, with pieces of coloured paper, a very pretty result may be obtained. I have in my possession cocoons composed of pink paper, another of blue and white, and a third of bright yellow. I have also a very singular cocoon which is made entirely of white muslin and brown elastic, although this specimen was quite unintentional as far as I was concerned. The larva was enclosed in a glass jam-jar, over the top of which I had placed a piece of muslin, with an elastic band round it, to prevent the larva from making its escape. The captive was ready to spin before I was aware of the fact, and, finding nothing in the bottle but leaves, endeavoured to escape by biting a hole through the muslin. Even then the caterpillar found that it could not get away, as the overhanging edges of the muslin did not reach near enough to the ground to enable it to climb down, and apparently it did not like to risk a drop. Doubtless it wandered round and round the edge of the muslin many hundreds of times before it finally decided to make the best of a bad job, and compose its cocoon of muslin and elastic. A friend of mine had another caterpillar which made its escape, and, after wandering round the room disconsolately, set to work, and composed its cocoon out of his best table-cloth! — H. W. SHEPHEARD-WALWYN (Dalwhinnie, Kenley).

SEXUAL SELECTION.

In his interesting paper on the “*Colouring of Stercorarius crepidatus*,” Mr. Edmund Selous gives it as his opinion that the gradations of plumage in this species are due to sexual selection. He finds no evidence in favour of natural selection in the case before him, and consequently he sets aside all probability of that agency. “Without evidence,” he writes, “such a view is a mere supposition, and therefore not worth while considering. The main facts suggest choice in a certain direction.”

It is the plain statement of personally observed facts which has made Mr. Selous’ papers in ‘The Zoologist’ so valuable; but what facts

does he bring forward as evidence of the influence of sexual selection on these birds? He gives a detailed account of the links which connect the extreme dark and the extreme pale colouring, and from this he concludes that sexual selection must have been at work. But is not this "mere supposition"? for the ascertained facts are too meagre to favour either natural or sexual selection. Does not Mr. Selous advocate the latter because at the outset he was "a believer in the reality of that power"?

It is to be hoped that Mr. Selous will write a paper on sexual selection, giving in support of that theory examples of actual choice in sexual matters as observed by himself in wild nature.

May I point out a slight slip in his choice of words? Would it not be preferable to speak of this species as *polymorphic* rather than *multimorphous*?—W. STORRS FOX (St. Anselm's, Bakewell).

BIBLIOGRAPHY.

I HAVE in preparation a catalogue of the vertebrate animals of Oxfordshire, and should be grateful for any information relating to the occurrence in the county of the following species:—Harvest Mouse, Dormouse, Black Rat, Lesser Shrew, Bank-Vole, Polecat (recent occurrences), Viper, Lizard, Sand-Lizard, Palmate Newt, Natterjack Toad, Crucian Carp, Rudd, Bream, White Bream, Grayling, Barbel.—O. V. APLIN (Bloxham, Oxon).

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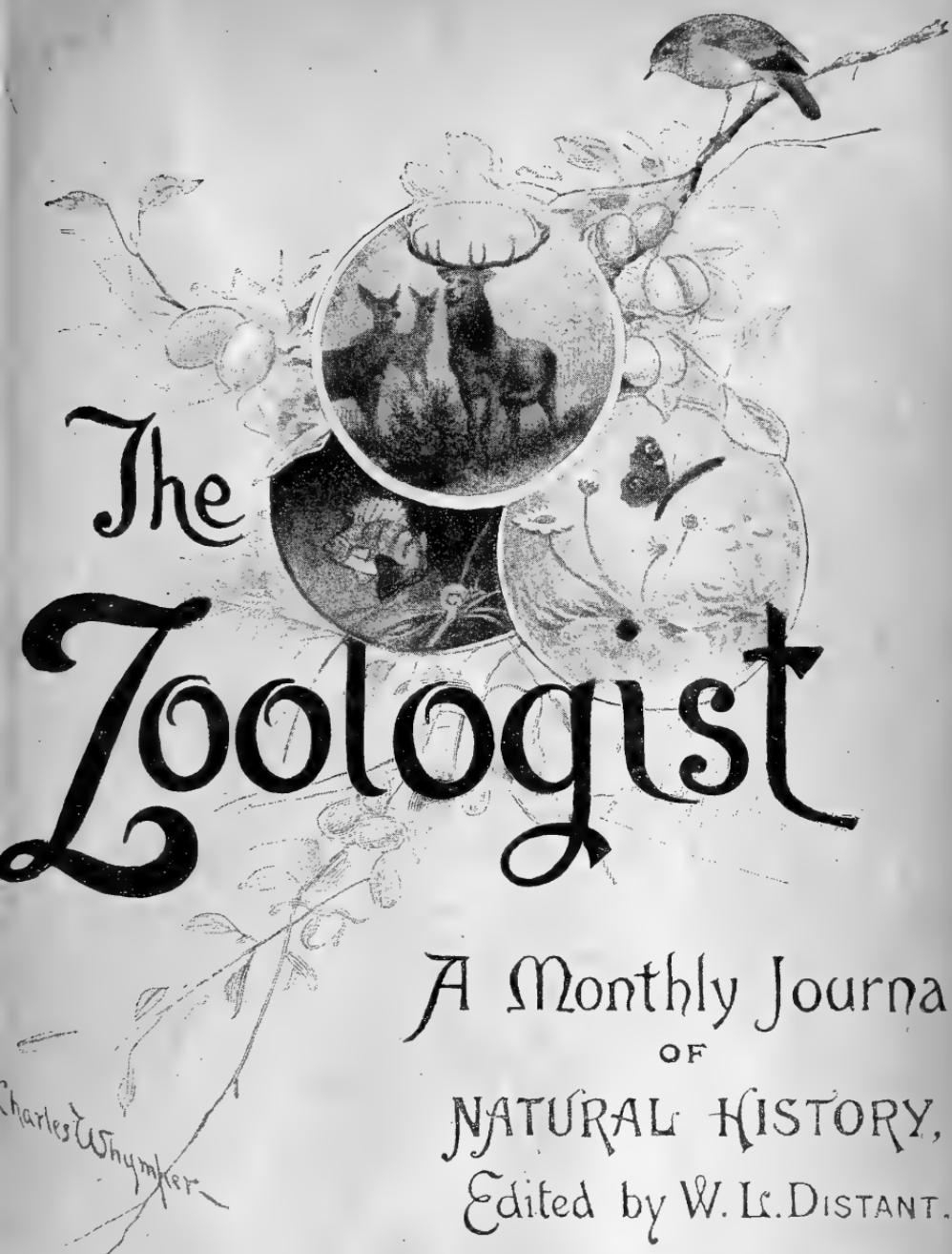
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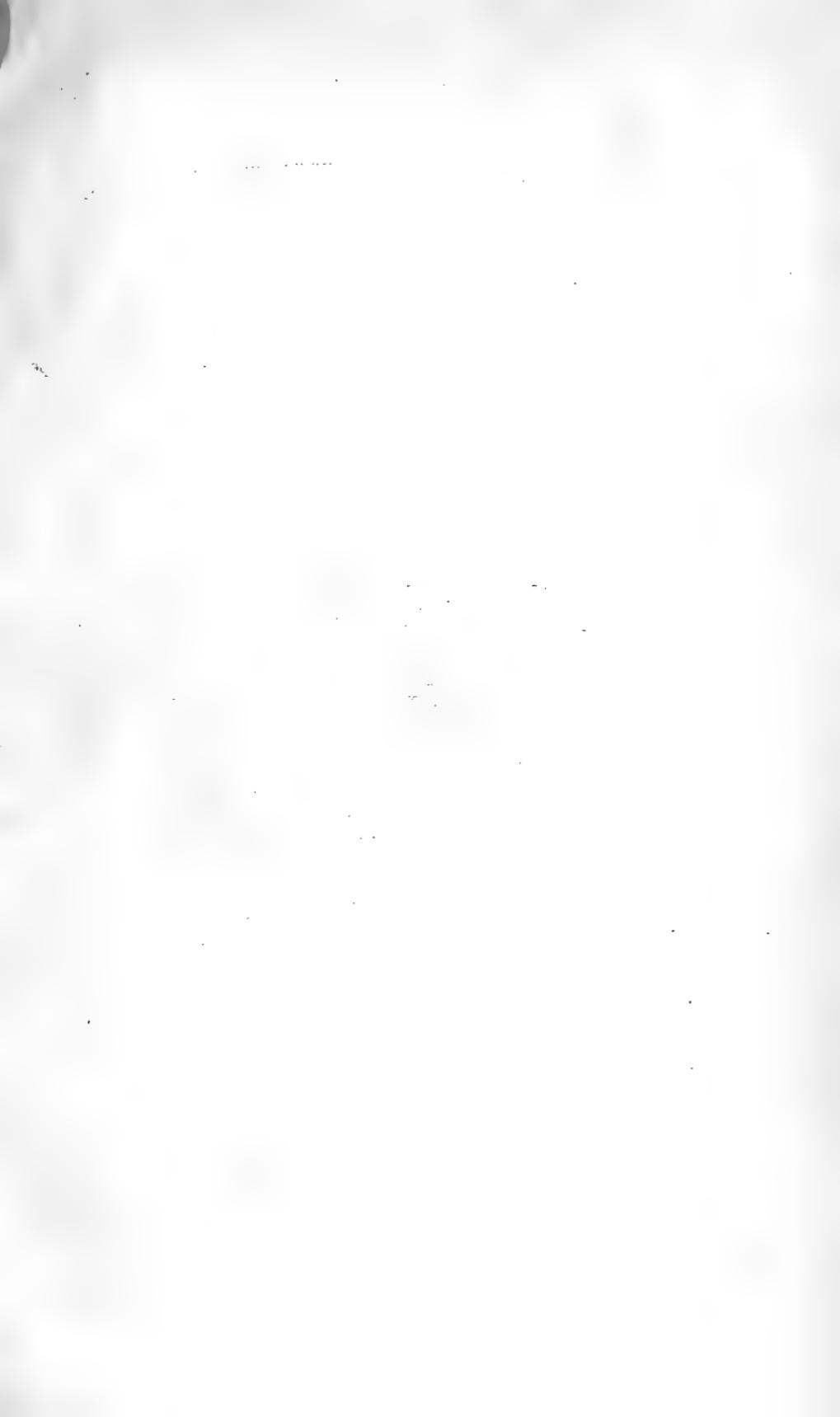
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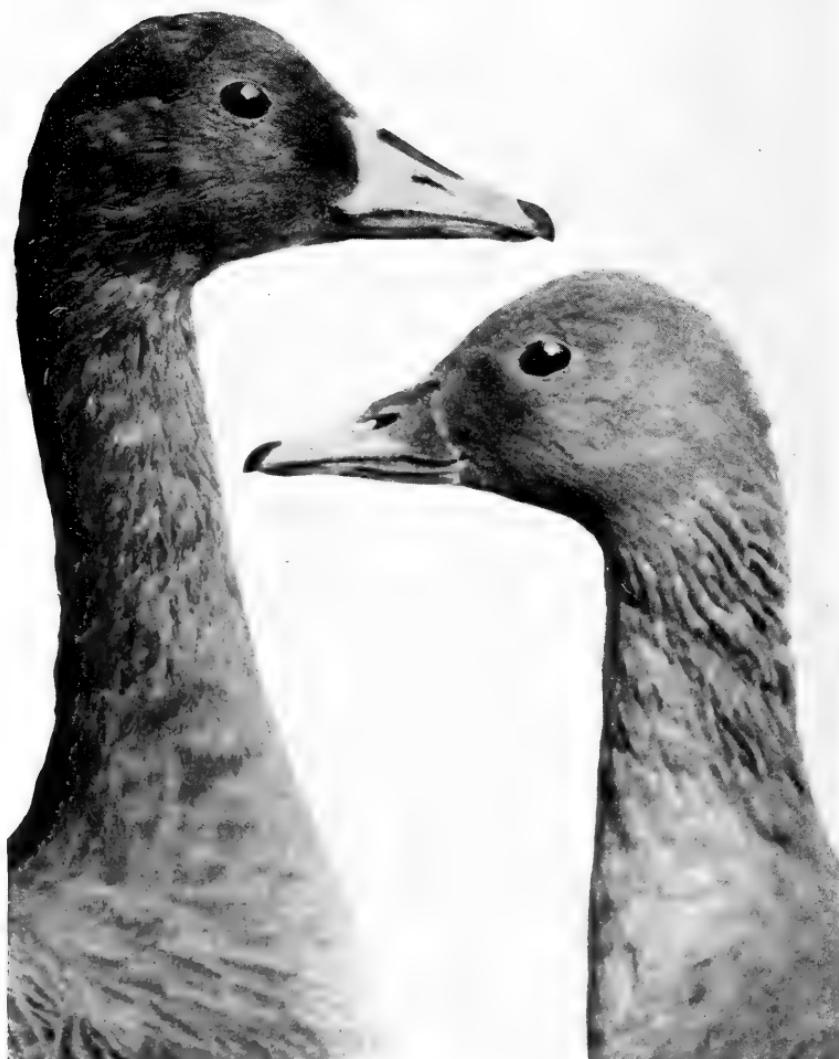
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Anser paludosus, Strickl.

Anser segetum, Gmel.

THE ZOOLOGIST

No. 738.—December, 1902.

ON A LOST BRITISH WILD GOOSE, *ANSER PALUDOSUS* (STRICKLAND).

BY F. COBURN.

(PLATE III.)

WHEN investigating the specific validity of *Anser gambeli* (*ante*, pp. 337) last winter, I resolved upon the overhauling of my entire series of British Wild Geese, some fifty to sixty mounted birds.

Upon coming to the turn of *Anser segetum*, I for the first time critically examined a bird which had always been a puzzle to me, and which I procured from St. Abb's Head, Scotland, on the 25th February, 1896. It was my intention at the time to fully examine the curious characters of this bird, but through extreme pressure of other business it was placed in a cabinet, and practically overlooked until this year. Fortunately I did not depart from my usual practice of making special notes on the colours of soft parts, and taking weight and measurements.

The characters of this bird which struck me most forcibly were its great size, being as large and heavy as a very big Grey-lag; the enormously lengthened swan-like neck; large and also swan-like feet; and the remarkably and distinctly shaped and coloured bill. These convinced me that the bird could not be *A. segetum*.

Upon further investigation, and a study of Count Salvadori's descriptions of the Wild Geese in the Brit. Mus. Cat. Birds, vol. xxvii., I was led to infer that the bird might be *Anser serrirostris* of Swinhoe, a name copied by Swinhoe from a manuscript left by the late John Gould, who intended to publish this name, but death intervened. I was strengthened in this belief from the fact that the serrations on the *lower* mandible of my bird were totally distinct in shape to those of *A. segetum*. However, I could not find any full description of this bird, and, subsequently receiving an invitation from Dr. Bowdler Sharpe to dine with the British Ornithologists' Club at their June meeting, I took my specimen, together with *A. rubrirostris*, to exhibit before the members.

Upon comparing my bird with the skins in the National Collection, I found that it was not *A. serrirostris*; and further, that there was no specimen in the Museum which would at all agree with my bird, especially as regards shape and colouration of bill. The result was that I could not formally bring the bird under the notice of the Club that evening, and did so incidentally only, pending a still fuller investigation at the Museum the next day, under the kindly assistance of Mr. Eugene W. Oates and Mr. Stewart Baker. The net result of this examination was simply to confirm my first enquiry: there was no bird like mine in the National Collection, and Mr. Oates intimated that I should be justified in giving the bird a name. This I was unwilling to do until further enquiries had been made, and I had prepared a paper for 'The Zoologist,' pointing out the characters of the bird. In the meantime I continued my investigations, and have now, I think, got to the real root of the subject, and can put a totally different complexion upon it.

There need be no doubt whatever that my specimen is the Long-billed Carr-lag Goose (*Anser paludosus*), first described by Strickland in 1858 before the meeting of the British Association at Leeds; and that Strickland was perfectly justified in describing the bird as a distinct species, there can be no shadow of doubt. It is much to be regretted that his observations did not receive more consideration at the time, as it is this neglect which has led to the bird being almost totally overlooked and forgotten for nearly fifty years. This might not have occurred but for a note

published in the 'Proceedings of the Zoological Society' (1861, p. 19), from Mr. A. D. Bartlett, asserting that the bird described by Strickland as *A. paludosus* was only an old male Bean-Goose. This was an unfortunate error of Bartlett, brought about probably by the very poor outlines of bills published by Strickland in the 'Annals and Magazine of Natural History' (1859, 3rd series, vol. iii. p. 124). If Bartlett (or anyone else) had ever seen a specimen of the Long-billed Carr-lag Goose like the one which is now before me, he would not have been inclined to declare that it was only a very old Bean-Goose. However, so much acceptance appears to have been accorded to Bartlett's note that it effectually disposed of Strickland's new species, which has been disregarded until the fortunate acquisition of my specimen has brought it to the front again; at all events, I hope this will be so.

It is deeply to be regretted that so little information concerning this once resident and breeding, but now completely banished, British bird remains to us. Practically all we know is contained in Strickland's paper, and he had, it would seem, to depend upon the information supplied by the carr-men; for the bird had disappeared even before his time.

I cannot do better than here quote some of Strickland's observations on this bird. He says:—"Before the beginning of this century, when the carrs of Yorkshire were the resort of countless multitudes and numerous species of wildfowl, giving employment to numbers of decoy-men, fowlers, and carr-men, I understand it was stated there were two species of Geese frequenting *and breeding* in the carrs, known by these people by the name of the Grey-lag and the Carr-lag. What the Grey-lag was is well known, as fortunately that bird retains the name originally given to it by the fowlers. What the Carr-lag was it is probably impossible now to demonstrate; but I have every reason to think it was this Long-billed Goose—a bird that resided and bred in the carrs along with the Grey-lag, and, like that, is no longer to be found in these districts, and, as far as I know, is not at present to be found in any part of this country, and is now one of our rarest British birds, or almost a lost species. This bird is distinguished from the Bean-Goose by its *entirely different habits*, and, as before stated, by its long bill. It

may be thought by some that this difference of length may be the result of age ; but this cannot be maintained, as its bill is small and weak, suited to its aquatic habits—very unlike the short bill of the Bean-Goose, suited to its granivorous and herbivorous feeding."

Here then we get the crux of the whole matter. A Goose of aquatic habits would need a long swan-like neck and large swan-like feet, the two characters which are so striking in my bird ! In the illustration which accompanies this paper, I publish for the first time the head and neck of *Anser paludosus*, side by side with that of a typical *A. segetum*. For their portraits to be taken the birds were placed opposite each other on exactly the same level, so that a glance will show the extraordinary disproportion in the length of neck in each bird ; at the same time the difference in shape and the remarkable colouration of bill in *paludosus* are apparent. I feel sure that no one who may critically examine these figures will fail to be convinced that the birds are of totally distinct species. A question which may have to be discussed in the future will be, whether the bird should not be placed nearer to *Anser cygnoides* than *A. segetum*. It is almost incredible that a bird so handsome and striking in appearance as this is should have so completely escaped observation, not only here, but on the Continent as well. I can only ascribe this to the extreme rarity of the species, for it is certain that if Count Salvadori had ever seen the bird he would not have passed it over.

As no complete description of this species has ever been published, so far as I can discover, I here append one :—

As before stated, the bird is of very large size, equalling a fine Grey-lag. The general tone of colouration of plumage resembles that of the Bean-Goose, but is much bolder and decisive-looking. The head is blackish umber from sides of bill, fading into a dark drabish umber for rest of head and upper neck ; at base of bill the faintest possible trace of white, curiously exaggerated by the camera in figure (p. 445) ; the middle and lower neck has a distinct rusty brown tinge. Mantle deep dusky brown, broadly margined with pale drab and light brown. Back and rump dark slaty brown. Upper tail-coverts white, the middle ones clouded with drab. Tail of eighteen feathers, long and broad, of a rich seal-brown, each distinctly fringed and very broadly terminated with white. Breast

and flanks drab, margined with paler, the flanks gradually becoming a rich seal-brown, broadly margined with white. The middle of the under parts are very pale whitish drab, gradually becoming white on abdomen and under tail-coverts. On the middle of the breast there is a black feather, with several others showing the dark pigment being thrown into them, while at the roots of most of the feathers on the sternum a dark colouring matter is making its appearance. This is very important indeed, as it indicates that during the



Anser paludosus, Strickl. Front view of bill.

breeding season the under parts may become black, a character quite unknown in the Bean-Goose. The upper wing-coverts are a dark bluish slate, gradually becoming rich hair-brown, broadly margined with dull white on the medians and first coverts. Primaries dark seal-brown, the rib white. Secondaries almost black, margined and fringed with dull white. Tertiaries rich seal-brown, very broadly margined with dull white; giving a very conspicuous appearance to the upper parts of the bird. Alulae rather pale bluish slate. Axillars and under wing-coverts dark slate. At the bend of the

wing a protuberance, which may have had a spur on it at some time. The bill is long, slender, and straight along the culmen, orange-yellow in colour from base to nail; along the culmen, commencing about half an inch from base, there is a remarkable shield-shaped patch of black, which will be best understood by referring to the figure. The nail is slaty black in colour, and larger in proportion than that of *A. segetum*. The under mandible is black from the base for three parts of its length, then a band of orange-yellow, and terminated with a black tip. There is a very important feature in connection with the bill. The serrations on the upper mandible are large and distinct, but do not show to advantage in the photograph. On the lower mandible the serrations are remarkable and quite distinct from those of *A. segetum*; they are large in size, sharply pointed, and directed backward, whereas in the Bean-Geese they are straighter, blunt, and more fused together. This suggests that the bill is adapted to pulling up roots of aquatic vegetation, and is a further valuable proof of the aquatic habits alleged by Strickland. The feet are very large, with the inside nails curiously curved inwards like those of a Swan; the first nail on foot white in colour, second and third half black and white. The legs, toes, and webs are orange-yellow in colour. Iride dark hazel. Weight, 8 lb.; total length, 35 in.; wing, 19 in.; tarsus, 3·55 in.; centre toe, 3·35 in.; bill, 2·60 in.

This bird appears to have been banished from Great Britain for something like a century! it must have found a home somewhere else—but where?

It has been suggested to me that *A. paludosus* may be identical with Brehm's *A. arvensis*. A paper on this latter bird has quite recently (Oct. 4th, 1902) been communicated to the 'Field' by Mr. Frohawk, who endeavours to prove that this is the common Bean-Goose of our land. I cannot at present agree with him on several points he raises.

At first I was somewhat inclined to think that *A. paludosus* might be identical with *A. arvensis*, as there is certainly some similarity between the bill of my bird and of that figured by Mr. Frohawk, but more mature study has for the present dispelled the idea. There is a similarity, and that is all. There are differences which would need much explanation. Mr. Frohawk appears to have examined a considerable number of Conti-

mental skins of *A. arvensis*, but he makes no mention of the long neck and swan-like feet. I do not think that Dr. Brehm would have bestowed such a name as *arvensis*—*i. e.* appertaining to a meadow or arable land—on a bird possessing such distinctly aquatic characters as a long neck and large feet imply. Further, as Brehm's name was given to his bird in 1831, it must have been well known to such an ornithologist as Strickland in 1858, who would not have given such a distinctly opposite name as *paludosus* (*i. e.* marshy or boggy) without good reasons for so doing. I am forced to the conclusion that *arvensis* does not possess these characters, consequently cannot be confused with *A. paludosus*. As none of the German works containing Brehm's observations on this bird are available where I write, nor are Continental skins, I am not in a position to hazard an opinion as to the specific validity of this bird.

There is one point in Mr. Frohawk's paper upon which I may touch briefly. It appears to me that he has too hastily come to the conclusion that the black on the bill of what he terms the true *A. segetum* must in all cases come well below the nostrils, leaving only a narrow band of orange. On this point Strickland, who must have seen great numbers of *A. segetum*, says: "But they vary greatly in the quantity and form of the black; indeed, I have seldom found two alike." This is my experience, and must also be that of others who have had much to do with Bean-Geese. A glance at my figure will show the typical bill of *segetum*, but with the yellow colour extending almost beyond the nostrils; in other cases I have seen the yellow reaching almost to base of bill. The fact is that the black is not permanent and both *paludosus*, *arvensis*, and *segetum* may have the black extending to below the nostrils at *some* period, but it fades away at others, leaving the bill in the latter bird sometimes entirely yellow, as is the case with a specimen now in the British Museum. In the case of the two former birds, the black remains only on the shield-shaped space of the first and the bar of the second. A change takes place in the colouring-matter on the bill of Bewick's Swan and several Ducks; why not in the Geese also?

This paper has already much exceeded the space I intended it to cover, notwithstanding which I shall have to pass over

several interesting points, and, in conclusion, direct attention to the very narrow escape this bird has had from complete oblivion. Utterly ignored by those of our forefathers who gave their time to ornithology, it appears to have been known only to those keen outdoor observers, the marsh-men and carr-men of half a century back. Their observations fortunately fell upon the discriminating ears of Strickland, but not until the bird had vanished from its native haunts.

How near these valuable observations of Strickland have been to complete oblivion, I have shown in the preceding pages. The appearance in Scotland of this solitary specimen of the long-lost bird, and its passing into my hands, are incidents almost sensational, if the full details were made known.

BIRDS COLLECTED AND OBSERVED IN THE
DARBHANGA DISTRICT, TIRHOOT, BENGAL.

BY GORDON DALGLIESH.

(Concluded from p. 389.)

Inocotis papillosus, Temm. (Black Ibis).—Very common. Generally known to planters as the “planter’s friend,” as they are useful in destroying insects injurious to the indigo plant. They are excellent birds for the table, but are difficult to shoot on account of their extreme wariness.

Plegadis falcinellus, Linn. (Glossy Ibis).—Not common. A fine male in breeding plumage was snared in March, 1901.

Platalea leucorodia, Linn. (Spoonbill).—I have never come across this species, but have a skin given me by Mr. Inglis, shot at Jainajar in January, 1897.

Ciconia alba, Bechst. (White Stork).—Very common in winter. These birds are caught by native fowlers, who sew the birds’ eyelids together; they are then placed on the edge of a piece of water as a decoy for other wildfowl. This cruel practice is common with all big birds, as Herons, Ibises, &c.

C. nigra, Linn. (Black Stork).—I only once saw this bird.

Dissura episcopus (White-necked Stork).—Fairly common, and often seen in large flocks. This bird is known to Europeans in India as “Beef-steak bird.” I once found a nest of this species; it was made of sticks, and placed in a lofty simul, or cotton-tree.

Xenorhynchus asiaticus, Lath. (Black-necked Stork).—A not uncommon resident.

Pseudotantalus leucocephalus, Penn. (Painted Stork).—A pair were seen near Darbhanga in May, 1901.

Leptoptilus dubius, Gmel. (Adjutant).—Seen occasionally during the monsoon.

L. javanicus, Horsf. (Lesser Adjutant).—Seen at Narhar by Mr. Inglis in November, 1898.

Anastomus oscitans, Bodd. (Open-Bill).—Fairly common by the sides of large pieces of water, and in rice-lands.

Ardea cinerea, Linn. (Common Heron).—A common winter visitor.

A. manillensis, Sharpe (Purple Heron).—Not so common as *A. cinerea*, but fairly plentiful in the cold weather.

Herodias alba, Linn. (Great Egret).—Scarce. I shot one in January, 1900, and saw another in February.

H. intermedia (Lesser Egret).—Several snared by fowlers in April, 1901.

H. garzetta, Linn. (Little Egret).—I saw one at Dalsingh Serai in August, 1900. It was in full breeding plumage.

Bubulcus coromandus, Bodd. (Cattle Egret).—Very common. It assumes breeding plumage in April. They breed in August in mango trees. Are very seldom seen fishing like other Egrets, and are often seen perched on the backs of cattle, or feeding near them.

Ardeola grayi, Sykes (Pond Heron).—Extremely common by nearly every piece of water. This bird is known to Europeans in India as "Paddy Bird." They breed in April in mango-groves, usually near water. From four to five is the full complement of eggs.

Butorides javanica, Horsf. (Little Green Heron).—Fairly common. It keeps to dense reed-beds during the day, and feeds chiefly at night. Breeds in colonies in May, June, and July.

Nycticorax griseus, Linn. (Night Heron).—Rare. I have very seldom come across any, and only possess a single specimen.

Ardetta sinensis, Gmel. (Little Yellow Bittern).—Very rare. I procured only one specimen at Dalsingh Serai in December, 1900.

A. cinnamomea, Gmel. (Chestnut Bittern).—Fairly common. I found one nest in August, 1900. The nest was simply a pad of rushes, and placed on the ground near a small pond ; it contained five fresh eggs.

Dupetor flavicollis, Lath. (Black Bittern).—I shot one pair at Bunhar Factory, Samastipur, in February, 1899, and Mr. Inglis procured another pair near Darbhanga.

Botaurus stellaris, Linn. (Bittern).—I shot one pair of this

species in four years. I do not think they are very common, but may be overlooked on account of their shy skulking habits. One of the birds I shot was only wounded, and made repeated savage thrusts at the man whom I sent to pick it up.

Anser indicus, Lath. (Barred-headed Goose).—Not a very plentiful bird anywhere in the district. It arrives in October, and stays sometimes till June.

Sarcidiornis melanopterus, Penn. (Comb Duck).—A small flock was seen by my brother at Dalsingh Serai in May, 1899, and one (a male) was shot. I happened to be away at the time, and the bird, which had been badly skinned by a native, was sent to me for identification, but arrived in a state of putrefaction.

Rhodonessa caryophyllacea, Lath. (Pink-headed Duck).—Mr. Oates, in his book on the 'Game Birds of India,' mentions Tirhoot as one place where this Duck is to be found. I never came across it myself, but Mr. Inglis writes me: "The man who brought me Duck and Teal described a bird, evidently this species, that was snared."

Casarca rutila, Pall. (Ruddy Sheldrake).—A common cold weather migrant, often staying on well into summer. They are, I have always found, extremely wary birds. Their flesh is not fit for the table, being very fishy in flavour.

Dendrocygna javanica, Horsf. (Whistling Teal).—A very common resident, often seen in flocks of many hundreds. They nest in trees during July and August.

Nettopus coromandelianus, Gmel. (Cotton Teal).—Very common on nearly all marshes. It breeds in July in the holes of trees.

Anas boschas, Linn. (Mallard).—Rare. A pair were shot out of two pairs on Hattowrie Lake, Darbhanga, in December, 1897, and I saw a solitary female at Dalsingh Serai in January, 1900, flying in company with some Gadwall.

A. poecilorhyncha, Forst. (Spotted-billed Duck).—Mr. Inglis procured a specimen in June, 1900, and I saw a pair at Dalsingh Serai in June, 1901.

Eunetta falcata, Georgi (Bronze-capped Teal).—Mr. Inglis was fortunate enough to secure seven of this rare species in the Mudubuni district, Darbhanga, in January, 1900—two males and five females. He very kindly gave me the skin of one of the females.

Chaulelasmus streperus, Linn. (Gadwall).—This is one of the commonest Duck found here in the cold weather. They begin to arrive very early, as in the year 1900 I saw a big flock on August 20th at Dalsingh Serai. I have never found this species shy unless they have been shot over a good deal. They seem to have no favourite haunts, and are found alike in both deep and shallow water. They are good divers when wounded, and I have always found the female better at concealing herself than the male.

Nettium crecca, Linn. (Common Teal).—Extremely common from November to March.

Mareca penelope, Linn. (Wigeon).—Scarce. I have very seldom seen this species, and possess very few specimens.

Dafila acuta, Linn. (Pintail).—Very common, arriving towards the end of October and leaving in February. During the cold weather of 1897 this Duck came in such enormous numbers to feed in the rice-fields as to do considerable damage to the crop.

Querquedula circia, Linn. (Garganey or Blue-winged Teal).—This is about the commonest Duck here in the cold weather, and one of the earliest to arrive, as I have seen several in August. It is possible that some remain to breed in the plains, as has been suggested by some ornithologists, but there is no authentic record of its having done so as yet.

Spatula clypeata, Linn. (Shoveler).—Fairly common. They begin to arrive in November, and stay sometimes to the end of April. This species is very wary and difficult to approach, and is the first Duck on the water to take alarm. It does not dive when wounded (at least, this is my experience), as most Ducks do, but tries to reach cover if there be any near.

Netta rufina, Pall. (Red-crested Pochard).—Extremely common, arriving in October and leaving in March.

Nyroca ferina, Linn. (Pochard).—Scarce. A small flock was seen at Dalsingh Serai in January, 1900. I bought off a native fowler a fine male in November, 1900, and shot another at Dalsingh Serai in January, 1901, out of a small flock. Mr. F. Finn, in his book, 'How to know the Indian Ducks,' says: "A male's eyes have been observed to change colour from red to yellow when it was handled." This was the case with the first

specimen I procured. On July 9th, 1901, a native fowler brought me in a Pochard in female garb, which on being dissected turned out to be a male. Was this a late stayer or an early arrival? The bird was in good condition, and the testes were enlarged, so it is just possible it may have bred somewhere near at hand.

N. ferruginea, Gmel. (White-eyed Duck).—Exceedingly common, though in the season 1901 I did not notice them so common as in previous years. They begin to arrive in September, and leave in April.

N. fuligula, Linn. (Tufted Duck).—A very irregular migrant. During 1899–900 I only got two specimens, but in the season 1900–01 ten were brought in by native fowlers, and I saw several when out shooting. Once when I was Duck-shooting I saw a small flock of these birds, and, on firing at them whilst they were sitting, I was surprised to see them all disappear under water, instead of flying away, as I expected.

Podiceps cristatus, Linn. (Great Crested Grebe).—Not at all common, and I only procured one specimen myself, and saw two or three others.

P. albipennis, Sharpe (Little Grebe or Dabchick).—Very common on almost every piece of water. It commences breeding in July. In the year 1900 I had a good opportunity of watching a pair nesting on a small pond. Both birds during this time kept up a curious "rattling" cry, though they are quite silent at other times of the year. The nest was made of rotting water-plants, and the eggs were always kept covered up. Both birds seemed to trust more to the heat of the sun for the hatching of the eggs than to the usual mode of incubation, and I never saw either bird sitting during the day. They appeared to be very restless, and kept on taking short flights across the pond, making a good deal of noise. The male bird was most attentive to the female during the period of incubation, always keeping close to her, and feeding her with small fish and aquatic insects. The young, when first hatched, are pretty little creatures, covered with greyish down striped with black. I once surprised a party of these birds, consisting of one old one and five young. The young at once tried to conceal themselves by hiding among the weeds, while the old one tried to draw my attention from them by fluttering, as if wounded, in front of

my boat. The usual number of eggs varies from two to five in number.

P. nigricollis, Brehm? (Eared Grebe).—In December, 1897, whilst out shooting Duck on a big broad, I saw a Grebe, which I am nearly certain was this species; but not collecting birds at the time, and knowing very little about Indian birds, and also not wishing to frighten the Duck by firing, I did not shoot it. Since then I have examined specimens of the Eared Grebe, and they exactly resemble the bird I saw. This Grebe has been procured in Calcutta, and will almost certainly be found here.

ROUGH NOTES ON DERBYSHIRE ORNITHOLOGY
1900-1902.

BY THE REV. FRANCIS C. R. JOURDAIN, M.A., M.B.O.U.

BEFORE resuming these notes, it may be as well to put on record two incidents omitted from my last paper (*Zool.* 1900, pp. 428-431). Two Whimbrels and a single Curlew, which had haunted a bleak hill-top near Swinscoe for a day or two, were killed on April 30th, 1899. This was on the Staffordshire side of the River Dove, and is the only recorded instance in which the Whimbrel has been killed in Staffordshire, although Mr. R. H. Read saw a small flock in Sept., 1886. A Water-Rail's nest was found at Sudbury with three eggs, at the end of July in the same year.

1900.

An extraordinarily early arrival of Fieldfares was reported by Mr. J. Henderson from the high ground between Ashburne and Buxton. Small flocks were seen here by Sept. 6th, and a week or so later others were noticed at Bradley and Ashburne. This is the only occasion on which I have known these birds to arrive in the county before October. A young Lapwing which was sent to A. S. Hutchinson for preservation, from near Melbourne, was a pale buff or cream-colour all over, with the exception of a few white feathers. Later in the year another beautifully-feathered cream-coloured bird was caught alive on the sewage farm at Egginton, but unfortunately was not preserved; and other light-coloured individuals were seen, but not secured (G. Pullen). A Black Tern was killed in the late summer at Etwall, and a Great Crested Grebe shot at Osmaston-by-Ashburne.

A Corncrake was reported ('Field,' Jan. 5th, 1901) to have been shot at Clifton on Dec. 26th, but it is quite possible that the bird may have been a Water-Rail; a gentleman who saw the bird assured me that this was the case. Up to Christmas the

weather was very mild and wet, and no snow fell till after New Year's Day.

1901.

A fair number of Woodcock were seen and shot in the Dove Valley in January. Three were killed in one afternoon at Norbury, where it is usually rather a scarce bird. On Jan. 17th (not 27th, as stated in the 'Field') a Bittern was shot at Spondon. The Wild Ducks at Osmaston began to breed exceptionally early, and a nest with seven eggs was found on Feb. 27th, and another with four eggs on March 2nd. On March 18th a Starling's nest between Bradley and Ashburne contained four eggs, quite a month before the usual date. Curiously enough, this was the same place where a nest was found in January, 1898, with nearly fledged young ('Knowledge,' 1898). On April 17th a Long-eared Owl was put off a newly-built Magpie's nest in Bradley Wood, near Ashburne, which proved to contain one young Owl, two hard-sat eggs, and three mice. The Redshanks, which are annually increasing their breeding range in the Trent and Dove Valleys, made their appearance this spring for the first time in the meadows between Norbury and Calwich. Near Calwich Grey and Pied Wagtails nested within a few inches of one another in the hollow left in the masonry of a wall for the insertion of a plank bridge. Kingfishers' nests were, I am glad to say, very numerous during this season on the Dove. Mr. Storrs Fox has already recorded (Zool. 1901, p. 270) the Little Bustard shot at Middleton Top, near Youlgreave.

On examining a Hawfinch's nest found on May 20th, the lining was found to be composed entirely of pigs' bristles. In suitable spots these birds are quite common, and several pairs may be found breeding within a space of a few hundred yards. They are, however, exceedingly shy, and forsake their nests very readily if eggs have not been laid. Deserted nests are at once dismantled, and the lining frequently removed, probably to help in the construction of another nest.

A Nightingale was reported to me as singing in the Holly Wood, Snelston, on the 21st, and Mr. W. H. Walton ('Field,' May 25th, 1901) mentions two in full song at Ockbrook, and another at Mickleover. The eggs in a Redstart's nest, taken at Thorpe on May 22nd, were distinctly spotted. This type occurs

in Staffordshire and other parts of England, but I have not previously met with it in Derbyshire.

A Blackbird and a Thrush were sitting within a few feet of one another on the horizontal beams which supported the roof of a barn near Ashburne on May 29th. In both nests the eggs were pale blue, either entirely without spots, or with only a few faint rusty markings. The Thrush's eggs, which were hard-sat, had much more gloss than the Blackbird's, but in colour the two clutches were almost exactly alike. A pair of Great Crested Grebes, which had apparently bred, were killed at the end of May near Chellaston, and early in the year one of a pair was unfortunately killed at Kedleston, and probably prevented from breeding there.

Two nests of the Tufted Duck at Osmaston, examined on June 12th, contained sixteen and eighteen eggs respectively; but there were three couple of Ducks about the place, and only two nests at this time, though another was made subsequently.

A Willow-Wren was sitting on four eggs in the middle of a strawberry-bed at Clifton on July 3rd, a somewhat unusual position for the nest. A Common Tern was noticed hovering over the Dove at Hanging Bridge on Aug. 24th. On Sept. 15th a Wood-Pigeon's nest with two eggs was found at Clifton, but, late as this nest was, it was not the last record for the season, for a Goldfinch's nest at Marchington contained three young, almost ready to fly, on Oct. 2nd (W. T. Mynors).

This year Mr. W. Storrs Fox informs me that a Dunlin's nest with four eggs was found on the Redmires Moors, and one of the old birds shot for identification. Although the Dunlin has long been supposed to breed in this district, this is the first time that eggs have been actually taken. A cream-coloured variety of the Jackdaw and a Magpie, in which the black plumage was replaced by light brown, were recorded from the Ashburne district.

The great snowstorms of December drove many Red Grouse from the North Derbyshire moors in a southerly direction. In the Dove Valley packs were reported from Kirk Ireton (J. B. E. Blackwall), and a single bird was flushed near Cubley.

1902.

The year opened with heavy floods in the Derwent Valley on the melting of the snow. Near Matlock the river rose over ten feet. Here a Bittern was shot about Jan. 2nd, and early in February a Waxwing was also killed at Matlock Bridge (R. Hall).

At the beginning of March a flock of four or five Great Black-backed Gulls were seen at close quarters one misty morning in the Dove Valley near Alsop Station (J. Henderson). Several Great Snipe were shot in the course of the winter in the low country round Derby. A very pretty Blackbird, with a pure white head and bold splashes of white on the body, was sent to A. S. Hutchinson for preservation.

The Redshanks did not return to the meadow near Norbury where they nested in 1901, but two pairs were reported to me as nesting near Uttoxeter, on the Staffordshire side of the Dove; and Canon Molineux tells me that he found a pair breeding in marshy ground not far from Staveley; so that this species is beginning to establish itself in the north-east as well as the south-west of the county.

Both cock and hen birds were roosting in a Long-tailed Tit's nest at seven p.m. on April 28th. The nest contained eleven eggs, slightly incubated, and the head of one of the birds could be seen through the entrance-hole. The number of eggs in the Grey Wagtail's nest appears sometimes not to exceed three. A nest at Norbury contained three hard-sat eggs, and another at Repton three young birds.

A cock Pied Flycatcher was seen in the Callow Wood, near Ashburne, on May 4th, by Mrs. Henniker; and on May 7th a Cuckoo's egg was found in a Hedge-Sparrow's nest—rather an early date for a Cuckoo to lay in this district. Another Cuckoo's egg, found near Dovedale on May 31st, was laid in a forsaken nest of the Blackbird, which contained a single egg. A third, also laid in a Blackbird's nest near Ashburne, hatched out successfully, and the young Cuckoo expelled the Blackbird's eggs. Grasshopper-Warblers were even more numerous than in 1901. Two nests which I saw were placed in high tussocks of coarse grass, and were quite invisible from above without parting the grass. The Cuckoo's note was heard daily till July 9th, and

on Aug. 28th Swifts were still flying around their nesting-place at Ashburne (A. Evans).

Early in the third week of August two Curlews (probably disturbed by the Grouse-shooting on the moors) made their way down the Dove Valley, and remained for a day or two near Mayfield.

A note appeared in the 'Field' of Aug. 2nd, from Mr. C. R. Gurney, stating that the Siskin had bred this year at Repton, in a low tree six feet from the ground, and that the eggs were fertile.

The year 1902 was remarkable for the cold and wet summer, and the unusually prolonged stay of some of our migratory visitors. The autumn song of the Chiffchaff was heard pretty regularly till Sept. 15th; and subsequently at intervals till Oct. 2nd, the latest date recorded for the county.

THE INDIAN PARIAH KITE (*MILVUS GOVINDA*):
A RECORD OF OBSERVATIONS MADE DURING
THE NESTING PERIOD.

By J. S. COSTELLO.

AN unique opportunity having presented itself for watching the habits of this bird during nesting, it was suggested that I should take notes of all the observations I made. The spot selected for the nest was the corner of a narrow abutting wall just below a window casement, so that I could without any difficulty have a close view of it at all times.

The nest I found was a heterogeneous medley of branches, bones, twigs, old pieces of cloth, leaves, and a few bones. This is curious in the light that the nests of most birds, with perhaps the exception of the Indian Crow, are usually composed of the branches and twigs of trees. I am unable to say definitely how long the process of completing the nest took, but it must have been over a week, as I had for many days noticed a gradual increase of the above-mentioned refuse, though at the beginning I had no idea as to how it originated. The event occurred in January, from which I infer that it is during the spring months of the year that this species of Indian Kite lays its eggs.

Unfortunately, in the present case I have not been able to determine the exact day on which the eggs were laid. I found two in the nest. To all appearance they resemble a large-sized fowl's egg. I noticed that the female did not incubate continuously all day. Occasionally I have seen it perched on the terrace of the building, occupying a position whence it could plainly see its nest, and when I opened the window it would come sweeping down, or, if in the nest, fluttered away, shrieking all the time, and circling about in front of its nest. This it would continue to do until the window was closed, when it settled down peacefully in its nest. On two or three occasions I went on the terrace to ascertain how it would

behave, and then my advent caused immediate alarm. Both the male and female Kites would hover about excitedly just above my head, and if I approached, however cautiously, too near the spot where the nest was, they swooped down quite close to me, as if threatening to attack.

The male bird invariably sat on the terrace, probably keeping sentry over the nest against possible invaders of its kind. I have never found it in closer proximity to the nest. At certain times in the day it was not there, being away most probably in search of food. I have noticed the absence of the female too for short periods, doubtless on the same errand as its mate.

On the morning of the 4th February, *i. e.* after an incubation of about three weeks' duration, I found that one egg was hatched. The young one was somewhat larger than a newly-hatched chicken. It had the usual amount of downy feathers, of an ashy hue, distributed over the body. The beak was very prominent, exhibiting markedly the characteristic curve of its species. When any kind of noise was made within its hearing it would feebly flutter its tiny wings, and behave as do young birds when a morsel is offered to them. The mother-bird was generally away in the mornings in search of food—a fact I knew from the circumstance that upon its return I invariably found bits of bone and other offal lying near the nest. The male was always somewhere near during these intervals of absence of its mate, for no sooner did I show myself at the window, then it would appear hovering about in front of the nest in a threatening manner, and, with its shrill piercing tones, endeavour to frighten me away. This it would never desist doing until I disappeared.

On the morning of the 7th I found the other egg was hatched, *i. e.* on the third day after the first one. This bird was smaller than its companion, which was all the difference that could be traced, and it appeared that they did not show nearly so much vitality as the young of other birds do directly after they have emerged from their eggs. They were usually to be seen nestled together asleep, and only when being fed or disturbed did they utter their feeble cries. I was not able to determine exactly whether the mother fed its young at regular

intervals. Judging, however, from the fact that it occupied itself all day in sheltering the fledglings in the nest, I am inclined to the belief that the mornings were generally selected by the mother as the feeding-time, and sometimes, though not often, during the afternoon. Now and again it was my custom to place a piece of meat on the window-sill, which the parent bird would carry to its nest, and make a meal of, not forgetting its progeny. In order to find out how it would behave when subject to terrorism while in its nest, I attempted on one or two occasions to frighten it with a stick, but, nothing daunted, it immediately assumed a threatening attitude, and commenced a series of assaults on the offensive object with a ferocity born of an instinctive resolve to defend the little brood and itself to the utmost. If I persisted in my efforts at intimidation, it would fly away, but only to return immediately and renew its formidable defence. On the withdrawal of the stick it would resume its peaceful avocation in the nest.

On the 21st February I found the younger fledgling dead in the nest. It was quite flattened out, a circumstance indicating that the mother must either have trampled it to death by accident, or sat upon it too heavily. The carcase was intact, but on the fourth day after the occurrence there was nothing left but a few fragments scattered about; the mother, apparently knowing that the bird was dead, had made a meal of it.

The nest itself now was more or less a mass of bones, causing it to emit a most obnoxious smell, and this offal doubtless formed the daily collection of food.

The other fledgling was growing apace, and its permanent feathers were now beginning to appear. It could stand erect and move about, though in a languid way, in the nest. The male bird continued keeping his accustomed watch on the terrace, while the female devoted her attention towards rearing the young, and bringing in the daily supply of food. I was particularly struck with this division and assignment of duties, conforming doubtless with some hidden rule which finds its analogy in the sphere of human relations.

The development of the young bird was gradual. As the days succeeded each other, and it became stronger and larger in stature, it would walk along the narrow edge of wall, ever and

anon preening its feathers, or gazing silently at its surroundings. The wild and untameable instincts of the Kite manifested themselves in this young fledgling, for whenever it saw me at the window, it would erect its feathers and wear a fierce aspect. Though the mother did not now sit on the nest, it was always close by, as if in tender solicitude for the safety of its young one.

On the 14th of March, *i. e.* thirty-nine days after it had come out of its egg-shell, I found that the young bird had flown—gone to play its humble part with its fellows in the great economy of life.

Calcutta.

NOTES AND QUERIES.

AVES.

A British example of the White-spotted Bluethroat.—At the meeting of the British Ornithologists' Club, held on Oct. 22nd, I had the pleasure of exhibiting the first authentic British-killed White-spotted Bluethroat (*Cyanecula wolfi*). This example—a fine adult male—was picked up dead close to the lighthouse at Dungeness, Kent, by a man named Gasson, on Oct. 6th of this year, and sent by him to Mr. Bristow on Oct. 8th, who on that date brought it up to me for examination in the flesh. My best thanks are due to Mr. Bristow for bringing it to me, and for lending it to me for exhibition.—M. J. NICOLL (10, Charles Road, St. Leonards).

The White Wagtail (*Motacilla alba*) on the Somerset Coast.—Mr. William Eagle Clarke, who deserves the gratitude of all ornithologists for the trouble he has taken in working out the migratory movements of some of our British birds, considers that the White Wagtail visits our islands chiefly as a bird of passage, *en route* to and from some northern breeding grounds, and that the west coasts of Britain form the main route followed by the migrants (see Third Interim Report of Committee appointed by the British Association to work out details of Bird Migration). As any evidence in support of a theory is useful, I may say that according to my experience this species is by no means uncommon on the coast of Somerset at the time of the spring migration. I have frequently noticed White Wagtails during the month of April on the sands near Weston-super-Mare, usually singly or in small parties consisting of two or three birds. The following dates of occurrences are taken from my note-books:—1898, April 12th and 18th; 1900, April 20th, 21st, and 27th; 1902, April 13th. During a ramble along the coast on April 23rd, 1902, I saw several of these birds between Blue Anchor and Watchet, and an observer at Minehead has informed me that they occur on the shore there in spring in good numbers, but only remain a short time. The species has also been noticed near Bristol, so it seems to be well distributed along the Somerset coast at the time of the spring passage, and if looked for at that time, when it may easily be distinguished from the Pied Wagtail

(*M. lugubris*), could probably be noticed every year in considerable numbers. With regard to the return passage in autumn, I have only two records from personal experience. About Sept. 10th, 1898, I saw one not far from Porlock ; and on Sept. 3rd, 1899, I saw an adult and an immature bird near Weston-super-Mare. These dates are consistent with Mr. Eagle Clarke's statement that "the return passage commences with mid-August, and is over by mid-September."—F. L. BLATHWAYT (Lincoln).

Water Pipit (*Anthus spipoletta*) in Sussex.—On Oct. 29th, whilst at Rye Harbour, Sussex, I shot a Pipit which flew over my head in company with another, and which proved to be an immature female specimen of *Anthus spipoletta*. I sent it to Mr. Howard Saunders for identification, and he kindly exhibited it for me at the November Meeting of the British Ornithologists' Club, as I was then abroad. This is, I believe, the eleventh British record, and the sixth for Sussex. Mr. Borrer (cf. 'Birds of Sussex') mentions four, and the fifth for Sussex was obtained at Hollington, Sussex, in February, 1900, and exhibited at a meeting of the British Ornithologists' Club by Mr. N. F. Ticehurst. This species seems to be distinguished from the Rock-Pipit by its whiter breast and under tail-coverts, its slightly browner back, and by having the outer pair of rectrices nearly pure white, as well as a large wedge-shaped white spot on the second pair.—M. J. NICOLL (10, Charles Road, St. Leonards).

Nesting of the Hawfinch in Breconshire.—The Hawfinch (*Coccothraustes vulgaris*), which appears to be increasing in this county, nested here last summer at least once, and probably twice or thrice, though absolute proof of its having done so is only forthcoming in one instance. Like the Cirl Bunting, which was first discovered nesting in Breconshire in 1890, it is, as a resident, evidently extending its range westward. I am not at liberty to name the exact localities where it occurred last summer, as in one case the Wild Birds' Protection Act was infringed, and there are other reasons for not doing so. The nest which was found was situated in the west of the county, in an orchard adjoining a large garden where peas are extensively grown. This is, no doubt, the most westerly point in Wales, and possibly in Great Britain, where the Hawfinch has so far been found to breed. The birds had been previously seen by the finder of the nest about this orchard, and on June 9th last he succeeded in locating it. It was placed on a horizontal branch of an apple tree about fifteen feet from the ground, and contained one typical egg. I went with him shortly afterwards to see the nest, which, viewed from the ground, looked rather like a

Tnrtle-Dove's, but was more solidly built. Hawfinches have been seen about the gardens near the locality above referred to for several years in the act of attacking the peas, and on two occasions several were shot. One of these—an adult male—is preserved in a Brecon collection. At another place, in the centre of the county, a small flock of Hawfinches, probably a family party, were found eating the peas in July last, and some of them, which were in the spotted plumage peculiar to very young birds, were shot. One of these is now in the collection of one of my neighbours. About the same time, in the east of the county, a flock were also detected damaging the peas in a large garden near Crickhowel. The Hawfinch has been observed nesting near this village several times in previous years.—E. A. SWAINSON (Woodside, Brecon).

Little Bunting at Durham.—This bird (*Emberiza pusilla*) was shot on the slag-bank at the Durham side of Teesmouth on Oct. 11th, after about a fortnight of east and north-east winds. Mr. C. Milburn and myself were walking along the top of the bank when we flushed it out of some rough grass at the side. We would have passed it for a female Reed-Bunting, but it uttered a different call—a sharp “*cit*”—so I shot it, and had it forwarded to Mr. Ogilvie Grant for identification. It was exhibited at the British Ornithologists' Club on Oct. 22nd, and is now in my possession. This is the second recorded British specimen.—C. BRAITHWAITE (Sea View Terrace, Seaton Carew).

Migration of Jays.—The communication on this subject by Mr. G. B. Corbin (*ante*, p. 434) explains to me the cause of a large influx of *Garrulus glandarius* into this district during the last few weeks. Knowing pretty well the average amount of this species bred annually in the district, their sudden increase surprised me, and I was at a loss to account for it. There are still an unusual number here, but evidently the greater part have gone onwards, probably westward. I have had as many as ten or twelve at once in the field opposite my windows, and frequently half a dozen or more at a time pecking the acorns off a Turkey-oak tree close to my “*den*” window. I had forgotten the recorded immigration of this bird in 1883, referred to by Mr. Corbin, and have no note on the subject; but at any rate I can safely say that there has been no such an influx here, since then, as that which I have now recorded. I have, however, a note in October, 1861, that “numbers of Jays came here this month, and devoured the apples picked up into heaps for cider-making.” That this might be the result of an immigration did not occur to me, and I evidently construed their presence to be simply due to the local attraction of my apple-heaps,

bringing together the normal Jay-population of the district.—O. PICKARD-CAMBRIDGE (Bloxworth Rectory, Dorset).

Glossy Ibis in Ireland.—Two specimens of this bird (*Plegadis falcinellus*) have been shot and sent to us for mounting—a male in fine plumage, shot at Lauwick, Co. Clare; female, shot near Wexford. Both birds are in immature plumage.—WILLIAMS & SON (Dame Street, Dublin).

A curious Water-Rail.—A Water-Rail (*Rallus aquaticus*) was shot close to this city on Nov. 13th, and brought to us for identification. The bird is entirely black, with the exception of the barred feathers on the sides, and the under tail-coverts, which are dull white; beak and feet black; eyes dark brown. We have seen white and cream-coloured varieties of this species, but this is the first instance of melanism we have met with during thirty years' experience.—WILLIAMS & SON (Dame Street, Dublin).

Knot inland in Cheshire.—A disabled Knot (*Tringa canutus*) was picked up at Bowdon, Cheshire, on the morning of Oct. 24th. The bird, which I saw in the flesh, had evidently been injured by striking the telephone-wires during the night. For three or four days previously the winds, S.W. or N.W., had been light, and on the night of the 23rd there was a slight breeze from the south-west, the greatest velocity of which was but twelve miles per hour, as recorded at a meteorological observatory eight miles away. From this we may reasonably conclude that the bird was a passing migrant, and not a storm-blown wanderer. To the best of my knowledge the Knot has never before been observed inland in Cheshire.—T. A. COWARD (Bowdon, Cheshire).

Notes from Suffolk.—Varieties of Fieldfare and Yellow Bunting.—On Nov. 20th I obtained in the flesh a very pretty variety of *Turdus pilaris*, recently shot at Thurston. It has the head, back, and wing-coverts spotted with white, and a single white primary in the left wing. Mr. Travis, the Bury birdstuffer, has lately set up a striking variety of the Yellow Bunting (*Emberiza citrinella*), apparently an adult male, which is practically entirely yellow, and looks at the first glance exactly like a pale Canary.

Peregrines in West Suffolk.—Two immature females of this species (*Falco peregrinus*), both of which I saw in the flesh, were sent to Bury for preservation during November. The first, an example of the pale type, was killed near Mildenhall about Nov. 3rd; the second, a much darker bird, was taken near Bury about the 16th.—JULIAN G. TUCK (Tostock Rectory, Bury St. Edmunds, Suffolk).

Ornithological Notes from Shetland.—On Nov. 8th I obtained a female Bullfinch (*Pyrrhula europaea*) in the garden here. This is, as far as I know, only the second authentic record of the bird in Shetland; for, though Messrs. Evans and Buckley mention a newspaper report of a bird having been shot in Unst about the beginning of February, 1893, no name is given as their authority. On July 12th I saw three Red-necked Phalaropes (*Phalaropus hyperboreus*), and one nest of four eggs. I was informed of the existence of three other nests with eggs in a neighbouring island, but had no opportunity of visiting the locality. The Great Skuas have this season started two new colonies in Unst. A Lesser Whitethroat (*Sylvia curruca*) was seen here by my wife and myself on Sept. 29th; we watched it for two days, after which it disappeared. This is the only Whitethroat I have seen during my four years' residence here. There were more Redwings (*Turdus iliacus*) this autumn than I have ever seen before. Fieldfares (*T. pilaris*) were not so plentiful as usual. Of the Red-breasted Merganser (*Mergus serrator*), I got two nests this summer; the birds have been fairly plentiful. A Water-Rail (*Rallus aquaticus*)—a male—was brought to me by a boy on the 9th of this month; he caught it in a drain close by the road. This bird is not very common here. Saw an Iceland Gull (*Larus leucopterus*) on Balta Island, Nov. 15th).

We have had most horrible weather since August—nothing but rain and gales, mostly from the S. and S.E. November half through, and corn in some places not yet in; some of it was only cut last week. Potatoes practically a failure this year also. I am going to experiment with trees again; the ones planted by my grandfather have been sadly neglected since his death twenty-two years ago, and, except in the large enclosure, are dying down, but I have got several hundred up this week, and am going to start planting to-morrow. There is no reason that I can see why trees should not grow, though of course they require care and attention. My mother planted a lot four years ago round her house, which occupies a most exposed situation, but they are all coming on well. It is curious that Frogs and Toads will not live here. I have tried them, but it seems no use; they just die off.—T. EDMONDSTON SAXBY (Halligarth, Baltasound, Shetland, N.B.).

On the Songs of Birds.—Dr. A. G. Butler (*ante*, p. 247) remarks most truly that the songs of birds, when endeavoured to be represented in words, are usually quite unrecognisable. Verbal representations of birds' songs are usually given with much local colour, as in respect to a particular Thrush, who persisted day after day in shrieking out close to me, as I gathered the close-netted strawberries, "Greedy

man, greedy man; pick 'em, pick 'em!" The self-consciousness of the hearer is in many other respects often quaintly appealed to by Thrushes; but one of the most ludicrous of this kind is the quiet self-satisfied and oft-repeated remark I have heard from one of our Pigeons (I think it is the Stock-Dove), as I grubbed away for spiders under a tree, "Look at the fool, look at the fool!" The "Take two cows, Taffy" of the Ring-Dove is, of course, well known. What, however, I have now specially taken up my pen for, is to record by musical annotation a Blackbird's song, with which I was regaled in May, 1900, day after day, for at least three weeks. I did not search closely, but I believe the hen bird was "sitting" close by; at any rate, the old cock sang his strain every day within a radius of twenty yards, as I frequently watched him, and my "den" being also close by with the window open, I became very familiar with his ditty. I may remark that, so far as I could make out, he had no other song at all. The notes were very soft, but yet full, fluty, and rich, and the intonation perfect. I never once detected it either out of time or out of tune. The strain would be repeated, generally, several times in fairly quick but not hurried succession; now and then it was more distinctly piano than at other times, and occasionally there was a little variation in the expression. When at last the song ceased I felt for some time as if one of my chief pleasures of the day was gone. Meantime, I wrote the strain on a scrap of music-paper, *et voilà* :—



—O. PICKARD-CAMBRIDGE (Bloxworth Rectory, Dorset).

BIBLIOGRAPHY.

HAVING undertaken the Birds for the forthcoming 'Victorian History of Suffolk,' and being desirous that the list should be as accurate as possible, may I be allowed to say that I should be very grateful for records of the occurrence of Savi's Warbler, Fire-crested Wren, Cirl Bunting, Golden Eagle, and Roseate Tern? Also for records of the breeding in the county within the last twenty years of the Bearded Tit and Hobby; and at any date of the breeding of the Pied Flycatcher, Golden Oriole, Hoopoe, Hen-Harrier, Marsh-Harrier, Kite, Bittern, Ruff, Black-tailed Godwit, Sandwich Tern, Gadwall, and Tufted Duck?—JULIAN G. TUCK (Tostock Rectory, Bury St. Edmunds, Suffolk).

NOTICES OF NEW BOOKS.

Salmon and Trout. By DEAN SAGE, C. H. TOWNSEND, H. M. SMITH, and W. C. HARRIS. New York: The Macmillan Company.

THIS book forms one of the series known as "The American Sportsman's Library"; it transports us to the rivers and lakes of North America, and in the recital of its interesting theme we forget that we are anglers, and as naturalists absorb its interesting bionomical facts and observations. The Salmon has long possessed almost a literature of its own, and it is worthy of it; Mr. Dean Sage occupies the first section of the volume with his story of the Atlantic Salmon. We all know the perversity with which fish will respond to the allurement of the fly, and every angler has engraven on his memory the reminiscence of those hours when they would rise at anything. Even injuries will not prevent this experimental voracity. Mr. Sage has known instances of fish taking the fly when so badly hurt as to make it seem almost incredible that they should want to move. "I took one which had lately lost a good pound of flesh by a Seal bite, and saw one of twenty-three pounds taken, which I afterwards learned had been hooked, played, gaffed, and lost the evening before about half a mile below. In addition to the fly embedded in his jaw with a yard of gut fast thereto, he had a deep open gaff wound in his shoulder." "The Pacific Salmons" are described by Messrs. Townsend and Smith, and the fine species of *Oncorhynchus* and *Salmo gairdneri* (the last in reality a Trout) receive concise but ample treatment.

To Mr. W. C. Harris is given the subject of the "Trouts of America." These fish appear to have given no less sport to the angler than satisfaction to the systematist in the elaboration of species and subspecies, a question with which we are now happily quite unconcerned. The living adaptations to their environment by these fishes are remarkable. In the Yellowstone Lake, Trout

are especially abundant about the hot overflow from the Lake Geyser Basin. The hot water flows for a time on the surface, and Trout may be taken immediately under these currents, and they have also been known to rise to a fly through a hot scalding surface. The Utah Trout not only lives in an alkaline lake, but thrives there, growing to a weight of twelve or more pounds; while a species of Salmon-Trout (*Salmo bathæcetor*), found in Lake Crescent, Washington, lives in deep water, in some places over seven hundred feet, and does not come to the surface at any season of the year.

The illustrations of this book are very beautiful, especially to an old angler who now no longer follows the craft. But these pages promote one considerable reflection, which is, that when fish are less studied to be hooked, or primarily watched for that purpose, an observant naturalist may find a new field; we want Gilbert White to follow Isaac Walton.

The Forests of Upper India and their Inhabitants. By THOMAS W. WEBBER. Edward Arnold.

MR. WEBBER as late Forest Surveyor for the North-West Provinces, and Deputy Conservator of Forests in the Central Provinces and Gorakhpur, has had unlimited opportunities for observing the natural history features of a varied faunistic region; his official duties frequently took him to little visited spots; his love of hunting wild game increased his experience, and he has written a book which may be well placed near Hooker's now classical "Himalayan Journals." The narrative, however, is not confined to the forest regions, and some of the most interesting chapters describe a journey to the roof of the world on the Tibetan frontier, an expedition which included the hunting of the Wild Yak (*Bos grunniens*), and that ancestral Sheep—*Ovis ammon*. On the mountain slopes near Gurla Mandhata the ground "seemed to be the breeding-place of all the Larks in India. Their nests were so numerous that one ran the chance of treading on them frequently. Indeed, all the birds and (other) animals except the Yaks were quite tame in this strange country. The mother Larks would sit within a yard of your feet, and almost let you put your hand on them, and the

white Hares, which abounded in some places, would sit up and stare at you not five yards off."

Although the principal zoological observations refer to the larger mammals, the ornithologist will find much very interesting matter. In the forests of the Bhabar, where the sal-tree (*Shorea robusta*) is probably the most dominant, or one-tree occupier of any forest in the world, many birds are noticed, and on open uncultivated flats the Spur-winged Plover (*Hoplopterus ventralis*) is found. Mr. Webber one day had an opportunity of seeing how useful this spur can be to the bird. "I saw one of these birds engaged in mortal combat with a snake which was trying to rob her nest, a perfectly bare spot on the bare ground. The bird got the best of the battle, inflicting some sharp spur blows on the serpent, which retired discomfited."

In practice there is probably no sport more exciting than the tracking and killing of large mammals; it is possible, however, that there is nothing more depressing than a long perusal of the operation. We sicken by our fireside, when without the excitement of the hunt we read of the crash of the bullet, and we visualize the efforts of the maimed quarry to escape. It is pleasant to learn from Mr. Webber that the inhabitants of the jungle do not regard man in India as an enemy, as shown by their extraordinary tameness, which "is a silent testimony from nature to the high humanity of the Buddhist and Hindu religions, which look on animal life as, alike with man's, divine."

Handbook of Instructions for Collectors. Issued by the British Museum (Natural History). Printed by order of the Trustees.

THERE are two conditions attached to all natural history collecting operations—one that the collector has his heart in the work, the other that he knows how to do it. This little work has been prepared to instruct any traveller, or colonist, who is anxious to learn how to assist the cause of natural history, and his great National Museum in London. There are simple rules for skinning and preserving vertebrates, and others for collecting and conserving invertebrates. The collection and preservation of plants and fossils are also described. This little book should be as necessary an item in the traveller's scanty baggage as is the proverbial tooth-brush.

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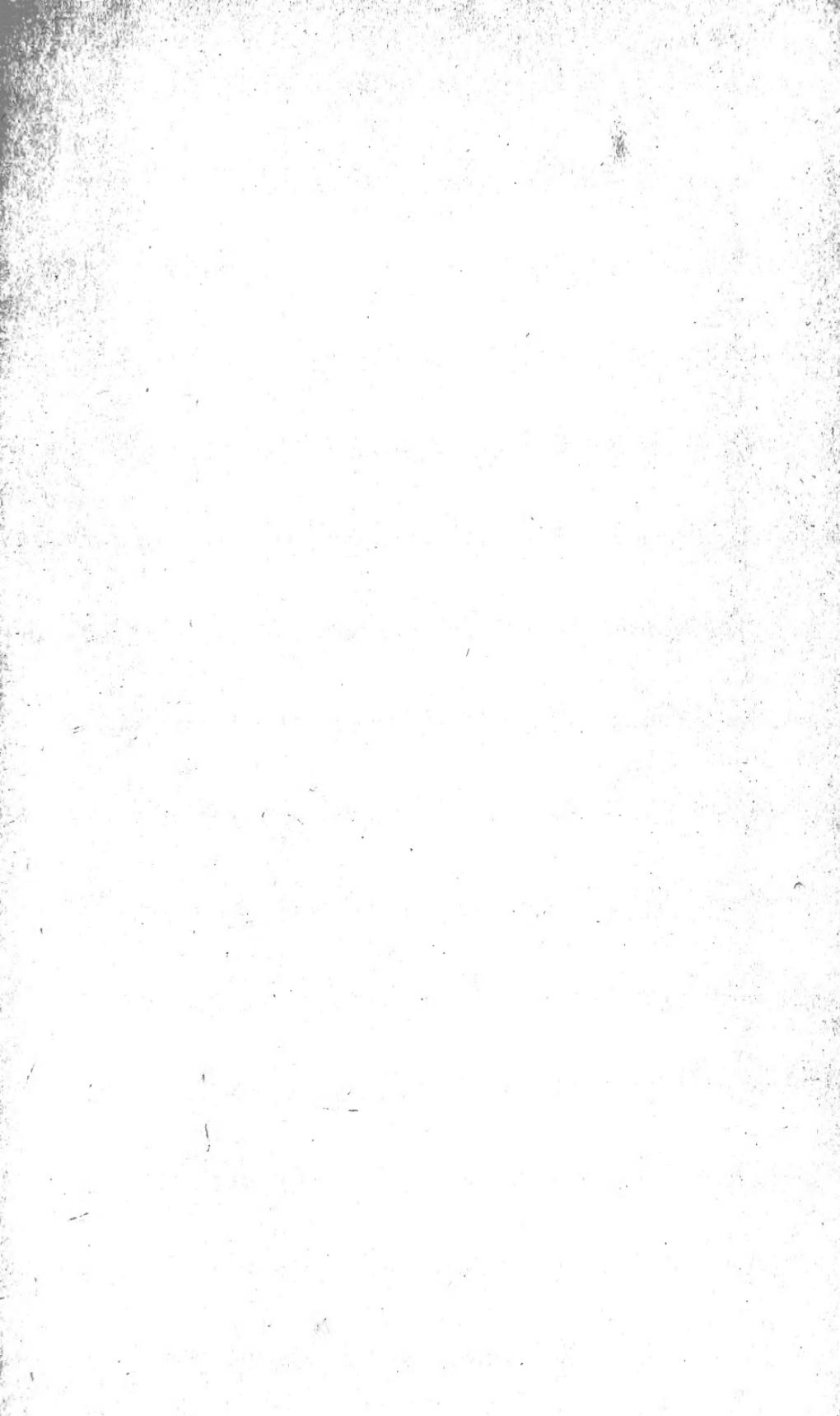
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